RECORD OF DECISION AMENDMENT

NL Industries, Inc. Superfund Site

Pedricktown, Salem County, New Jersey

U.S. Environmental Protection Agency

Region II

September 2011

DECLARATION STATEMENT
RECORD OF DECISION AMENDMENT

SITE NAME AND LOCATION

NL Industries, Inc. Superfund Site (EPA ID# NJD061843249)
Pedricktown, Oldmans Township, Salem County, New Jersey

STATEMENT OF BASIS AND PURPOSE

This decision document presents the Amended Remedy for contaminated groundwater at the NL Industries, Inc. Superfund Site (the Site) located in Pedricktown, Oldmans Township, Salem County, New Jersey. The original Record of Decision (ROD) addressing contaminated soil, sediment and groundwater at the Site was issued on July 8, 1994.

The Amended Remedy was selected in accordance with the requirements of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §9601 et seq., and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300. This decision is based on the Administrative Record file for the Site, an index of which can be found in Appendix IV.

The State of New Jersey concurs with the ROD Amendment. A copy of the related concurrence letter can be found in Appendix V.

ASSESSMENT OF THE SITE

The response action selected in this ROD Amendment is necessary to protect the public health, welfare, or the environment from actual or threatened releases of hazardous substances from the Site into the environment.

DESCRIPTION OF THE SELECTED REMEDY

The response action described in this document modifies the groundwater component of the remedy selected in the 1994 ROD. The soil and sediment activities called for in the 1994 ROD have been largely completed. Some additional excavation of sediment in the West Stream is under way. A 1991 ROD addressed slag and lead oxide piles, contaminated surfaces and debris, and standing water.

The major components of the Amended Remedy include the following:

- In-situ pH adjustment and reagent injection for the contaminated unconfined aquifer via injection wells;

- Monitoring of groundwater; and
- Implementation of institutional controls to restrict the use of contaminated groundwater until cleanup goals are achieved.

DECLARATION OF STATUTORY DETERMINATIONS

Part I: Statutory Requirements

The Amended Remedy is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial actions to the extent practicable, and is cost-effective. EPA has determined that the Amended Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Site.

Part 2: Statutory Preference for Treatment

The Amended Remedy meets the statutory preference for the use of remedies that involve treatment as a principal element.

Part 3: Five-Year Review Requirements

Because the remedy will not result in hazardous substances, pollutants, or contaminants remaining above levels that allow for unlimited use and unrestricted exposure, EPA anticipates that a statutory five-year review will not be required for the groundwater remedy. However, because it may take more than five years to attain remedial action objectives and cleanup levels for the groundwater at the Site, policy reviews will be conducted until the remediation goals are achieved to ensure that the groundwater remedy is, or will be, protective of human health and the environment.

ROD DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this ROD Amendment. Additional information can be found in the Administrative Record file for this Site.

- Chemicals of concern and their respective concentrations may be found in the "Site Characteristics" section.
- A discussion of source materials constituting principal threats may be found in the "Principal Threat Waste" section.
- A discussion of the baseline risk represented by the chemicals of concern may be found in the "Summary of Site Risks" section. This discussion is based on the baseline risk assessment from the 1994 ROD. Cleanup goals for groundwater contamination can be found in the "Remedial Action Objectives" section.
- Current and reasonably anticipated future land use assumptions and current and potential future uses of groundwater used in the baseline risk assessment and ROD can be found in the "Current and Potential Future Site and Resource Uses" section.
- Estimated capital, operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected can be found in the "Description of Remedial Alternatives" section.
- Key factors that led to selecting the remedy may be found in the "Comparative Analysis of Alternatives" and "Statutory Determinations" sections.

Walter E. Mugdan, Director
Emergency & Remedial Response Division
EPA - Region II

Sept. 13, 2011
Date

RECORD OF DECISION AMENDMENT

DECISION SUMMARY

NL Industries, Inc. Superfund Site

Pedricktown, Salem County, New Jersey

U.S. Environmental Protection Agency
Region II
New York, New York
September 2011

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Appendices

SITE NAME, LOCATION AND DESCRIPTION

The Site is located to the north of Pennsgrove-Pedricktown Road, in Pedricktown, Oldmans Township, Salem County, New Jersey. The Site location is shown on Figure 1 and Figure 2. The 44-acre Site is bordered on the south by Pennsgrove-Pedricktown Road and is bisected by an active railroad (i.e., Conrail Right-of-Way). Approximately 16 acres are located north of the railroad, including a closed, 5.6-acre landfill operated and maintained by NL Industries, Inc. (NL Industries). The southern 28 acres contain the former NL Industries process area and the NL Industries landfill access road. NL Industries maintains the closed landfill area and operates the leachate collection system.

The West and East Streams, which are intermittent tributaries to the Delaware River, border the Site to the west and east, respectively. These streams receive runoff from the Site. The Delaware River is approximately 1.5 miles north of the Site. Industrial properties are located east of the former NL Industries process area. U.S. Route 130 is located north of the Site. Several residential properties are located adjacent to and west of the West Stream. Other properties in the general vicinity of the Site are used for commercial, residential, agricultural, and military purposes.

SITE CHARACTERISTICS

Site History

Between 1972 and 1984, NL Industries, Inc. and subsequently National Smelting of New Jersey (NSNJ), conducted secondary lead smelting and lead-acid battery reclamation operations. As a result of these operations, soil at the Site was contaminated with metals, primarily lead. In addition, elevated levels of lead, copper and zinc were detected in stream sediment and surface water. Groundwater contamination detected at the Site consisted primarily of lead and cadmium, with localized areas of elevated levels of volatile organic compounds (VOCs).

The Site was listed on the National Priorities List (NPL) in 1983 and a remedial investigation (RI) and feasibility study (FS) were conducted between 1986 and 1993. Between 1989 and 1996, EPA conducted multi-phased cleanup activities at the Site to address immediate public health concerns. Activities included, but were not limited to, the construction of security fences, encapsulation of slag (byproduct of smelting operations) piles, removal of toxic materials, demolition of buildings, and removal of the most highly contaminated stream sediments.

EPA divided the Site into two Operable Units (OUs) to facilitate remedial activities. A ROD for OU2 was issued by EPA in 1991 and addressed slag and lead oxide piles, contaminated surfaces and debris, and contaminated standing water. OU2 activities were initiated in 1992 and included off-site reclamation of lead-containing materials, solidification/stabilization and off-site disposal of slag and other materials, decontamination of building floors and surfaces, off-site treatment and disposal of contaminated standing water, building demolition, and environmental monitoring. The OU2 activities were completed in September 1995.

The ROD for OU1 was issued by EPA in 1994 and addressed the remediation of soil, groundwater, surface water, and stream sediment. OU1 activities for the soil and stream sediment were initiated in January 2000. Remedial Action Objectives (RAOs) for OU1 included the following: 1) to leave no greater than 500 parts per million (ppm) of lead remaining in site soils and stream sediments; and 2) to restore the contaminated unconfined aquifer to drinking water standards for all contaminants. Established cleanup standards for each contaminant of concern (COC) for groundwater were listed in the ROD. To date, the groundwater portion of the remedy has not been implemented while the surface water, sediment and soil source removals were performed. Note that an Explanation of Significant Differences (ESD) was issued in 1999 which pertained to the soil/sediment portion of the remedy selected in the 1994 ROD. The ESD documented the change from disposing of excavated soil/sediment in an on-site landfill to the disposal of excavated soil/sediment to an off-site landfill.

<u>OU1 Soil/Sediment Activities</u>
Remedial activities included the excavation of soil and sediment containing greater than 500 ppm of lead, as stated in the OU1 RAOs. Approximately 150,928 tons of treated soil and sediment were removed and disposed of off-site. The soil and sediment remedial activities for OU1 were completed in July 2003, and a biological monitoring plan was initiated. Recent sampling showed that there are lead levels in the sediment above the cleanup standards in a portion of the West Stream between Pennsgrove–Pedricktown Road and Route 130. This contaminated sediment will require additional remediation, which is scheduled to begin in September of 2011. The soil/sediment activities are not the subject of this ROD Amendment and will therefore not be discussed in further detail.

<u>OU1 Groundwater Activities</u>
OU1 groundwater monitoring was initially conducted during the RI in 1988 and 1989. Site-related contaminants were detected in the groundwater of the unconfined aquifer at the Site during the RI and the data indicated that the contamination in groundwater was limited to the unconfined aquifer. The contaminants detected in the unconfined aquifer were comprised primarily of lead and cadmium; however, VOCs, arsenic and radiological parameters were also detected in localized areas of the Site. Arsenic was later determined to be related to landfill leachate. Subsequent improvements were made to the landfill, eliminating the seeps and the arsenic detections.

As part of the remedial design (RD) for the groundwater remedy, two phases of groundwater evaluations were conducted. Phase I was conducted in 1997. Twenty groundwater samples were collected and analyzed for VOCs, semi-volatile organic compounds (SVOCs), total and dissolved metals, cyanide and radiological parameters. Water quality parameters, such as pH and oxidation-reduction potential, were also monitored. Phase I sampling identified the relationship between pH and metal solubility in groundwater. Low groundwater pH was correlated with higher concentrations of lead and cadmium in groundwater. The Phase I sampling also indicated that concentrations of COCs in groundwater at the Site had decreased since the late 1980's when the RI was conducted.

The Phase II groundwater evaluation was initiated in 1998 and included installation of additional monitoring wells, sampling of potable groundwater from residential wells along Route 130, aquifer testing, evaluation of the capture zone of groundwater extraction wells, geochemical evaluation of Site subsurface soils, and groundwater flow and transport modeling. The radiological parameter analysis, conducted as part of the Phase II evaluation, did not indicate a radionuclide source at the Site as there was no clear pattern of radionuclide occurrence in the subsurface. Radiological parameters were only detected in samples obtained from deep-zone wells adjacent to clay layers at the Site during the Phase II evaluations, which led to the conclusion that the radiological parameters are naturally occurring and not related to former Site uses. Therefore, no further analysis of radionuclides was required. Aquifer testing was conducted to determine the adsorption capacity of the aquifer. Testing revealed that there were adequate amounts of iron and manganese oxide/hydroxide coatings in the aquifer soils to provide adsorption capacity for lead and cadmium to precipitate out of groundwater due to natural attenuation processes. Pump tests indicated that constant pumping of the contaminated groundwater would not be highly efficient at removing lead and cadmium. It was calculated that it would take between 50 and 60 years of aggressive pumping to remove lead and cadmium from the groundwater and achieve cleanup standards. Furthermore, Phase II testing continued to show a decrease in the mass of lead and cadmium remaining in the groundwater over time.

<u>Groundwater Contamination</u>

The Site is underlain by three hydrogeologic units: the unconfined (uppermost and water table) aquifer; the first confined aquifer; and the second confined aquifer. The unconfined aquifer is part of the Cape May Formation and averages approximately 20 feet in thickness. The unconfined and first confined aquifers are separated by a clay layer ranging in thickness from about 5 to 20 feet. The first confined aquifer exists approximately 50 to 70 feet below grade and is part of the Raritan Formation. The second confined aquifer is also part of the Raritan Formation. The first and second confined aquifers are separated by a clay layer of approximately 30 feet in thickness.

Groundwater sampling has confirmed that contamination is currently limited to the unconfined aquifer. The unconfined aquifer has historically been subdivided into two zones; the shallow and deep zones. The shallow zone generally ranges from 5 feet below ground surface (bgs) to 25 feet bgs. The deep zone generally ranges from 25 feet bgs to 50 feet bgs. The terms shallow and deep relate to screened intervals of wells and not to geologic materials. Screen depths for monitoring wells in these zones range from approximately 5 feet below grade in the shallow zone to approximately 50 feet below grade in the deeper zone. Where two wells were installed as pairs, the shallower one was labeled shallow and the deeper of the pair was labeled deep. For purposes of evaluation, where a well is not installed as part of a pair it is grouped with either shallow or deep wells based on screen depth.

Groundwater flow direction in the unconfined aquifer, as inferred based on groundwater elevation data, is primarily west across the Site towards the West Stream. The groundwater flow rate is approximately 27.5 feet per year; however, the total mass of contaminants flow at a lesser rate due to natural processes, such as precipitation and adsorption reactions, that remove contaminants from groundwater and bind them to aquifer soils, thereby limiting their mobility.

In addition to groundwater sampling in the 1980's and 1990's, groundwater monitoring was conducted in 2004, 2007 and 2010. Data from all groundwater monitoring events indicate that the lead and cadmium concentrations have generally decreased over time and that at this time the majority of the contaminated groundwater is located beneath the former facility area (See Figures 3 through 8). Significant migration of contaminants has not been observed in recent sampling events. Between 1983 and 2010, the mass of lead in the groundwater decreased from approximately 220 pounds to 2.7 pounds. For cadmium, the mass has decreased from approximately 70 pounds in 1988 to 5.9 pounds in 2010. The current volume of groundwater impacted by lead is approximately 1.5 million gallons and 11.8 million gallons for cadmium.

Recent residential groundwater sampling was also conducted in 2004, 2006, 2007 and 2010 for those residences located north of the Site along Route 130. During each of these monitoring events, lead and cadmium concentrations in the residential water samples were either not detected, were significantly below the applicable New Jersey drinking water standards, or had minor detections believed to be a result of plumbing issues as opposed to site-related contaminant detections.

Removal of contaminated source material, as a result of OU1 soil/sediment and OU2 activities, has resulted in the observed significant decrease in lead and cadmium groundwater concentrations. Equilibrating pH values have also contributed to the continued decrease in lead and cadmium concentrations in groundwater. At low pH, metals are more soluble and tend to stay in solution. At higher pH values, the metals tend to adsorb to the aquifer soils. In 1983, groundwater pH values in the contaminated unconfined aquifer mainly ranged from a pH of 3 to a pH of 4 (See Figure 9). This lowered pH was a result of the battery acids that were released on-site as a result of the NL Industries, Inc. facility operations. More recent data from 2010 groundwater samples indicates that pH values of the contaminated unconfined aquifer are closer to a pH of 5 (See Figures 10 and 11). The natural pH range for the Site is between 5 and 6. Rising pH values are a result of natural equilibration subsequent to contaminant source removal. Oxidation-Reduction potential (Eh) also contributes to metal solubility.

While lead and cadmium have significantly decreased over time, the concentrations still exceed the current drinking water standards.

There is no distinct VOC plume at the Site; however, VOCs have historically been detected at three wells at the Site . Total VOC concentrations have generally decreased over time and these concentrations are expected to continue to decrease. Groundwater data collected in 2010 indicate that vinyl chloride and tetrachloroethene are the only site-related VOCs detected above the drinking water standards. Further, these two contaminants have been detected at only three of the twenty-eight groundwater monitoring wells at concentrations slightly exceeding the drinking water standards. Two wells had vinyl chloride concentrations of 7.7 parts per billion (ppb) and 6.9 ppb. One well had a tetrachloroethene concentration of 1.6 ppb. The cleanup standard for vinyl chloride and tetrachloroethene is 0.08 ppb and 0.4 ppb, respectively. However, the practical quantitation limit (PQL) for vinyl chloride and tetrachloroethene is 1 ppb. The PQL is the lowest concentration that can be reliably detected by a laboratory during routine laboratory operating conditions as established by NJDEP as part of the NJGWQSs. Therefore, the cleanup standard for vinyl chloride and tetrachloroethene that can be demonstrably attainable using standard laboratory methods is 1 ppb. All COCs initially listed in the ROD, including vinyl chloride and tetrachloroethene, will continue to be monitored to ensure that cleanup levels are achieved.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Proposed Plan and supporting documentation for this ROD Amendment were released to the public for comment on June 22, 2011. These documents were made available to the public at the EPA Administrative Record File Room, 290 Broadway, 18th Floor, New York, New York and the Penns Grove Public Library, 222 South Broad Street, Penns Grove, New Jersey.

On June 22, 2011, EPA issued a notice in *Today's Sunbeam,* a Salem County newspaper, which contained information relevant to the public comment period for the Site, including the duration of the comment period, the date of the public meeting and availability of the administrative record. Postcards, containing the same information were also mailed to individuals on a mailing list maintained by EPA for the Site. The public comment period began on June 22, 2011 and ended on July 21, 2011.

EPA held a public meeting on July 7, 2011 to explain EPA's preferred groundwater remedy, reagent injection plus institutional controls. The purpose of the meeting was to inform local officials and interested citizens about the Superfund process, to discuss the Proposed Plan for the ROD Amendment and receive comments on the Proposed Plan, and to respond to questions from area residents and other interested parties. Responses to the comments received at the public meeting and in writing during the public comment period are included in the Responsiveness Summary, attached as Appendix III to this ROD Amendment.

CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

The Site was formerly used as a secondary lead smelting facility. As part of EPA's previous cleanup actions, all facility buildings and debris were cleared from the Site. Currently, there are no building structures located on the former facility area; however, there are a series of monitoring wells located throughout the Site which are used to monitor groundwater. Other Site features, including the closed landfill, West Stream, active rail line and wetland areas remain (See Figures 1 and 2). Residential and commercial properties are located west of the Site, along Benjamin Green Road, and north of the Site, along Route 130. Residences located along Benjamin Green Road obtain their water from the municipal water system. However, residences along Route 130 utilize water from private wells. Other properties in the vicinity of the site are used for commercial, residential, agricultural and military purposes. The former facility portion of the Site is zoned commercial. There is potential for redevelopment of the former facility portion of the Site. Since the groundwater remedy selected in this ROD Amendment calls for in-situ treatment via reagent injection, it is possible that appropriate redevelopment of the former facility area can begin prior to completion of the remedy.

BASIS FOR REMEDY MODIFICATION

This is an amendment to the July 8, 1994 ROD for the NL Industries, Inc. Superfund Site. The 1994 ROD selected extraction and treatment of groundwater and surface discharge to the Delaware River to address the threats posed by contaminated groundwater in the unconfined aquifer. Immediate public health concerns were first addressed through the 1989 Early Removal Actions, the 1991 OU2 selected remedy and the Soil/Sediment component of the 1994 OU1 ROD, as described above. While these actions were taking place, groundwater monitoring and investigations continued to be conducted; however, the groundwater remedy was not implemented.

In addition, Five-Year Reviews were conducted in 1998, 2003 and 2008 pursuant to Section 121(c)of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 U.S.C. Section 9601, et seq., and 40 C.F.R. 300.430(t)(4)(ii) and in accordance with the Comprehensive Five-Year Review guidance, OSWER Directive 9355.7-03B-P (June 2001). The purpose of a Five-Year Review is to determine whether the remedies at the Site are protective of human health and the environment and function as intended by the decision documents. With respect to groundwater, in this interim period prior to remedy implementation, residences along Benjamin Green Road located between Pennsgrove-Pedricktown Road and Route 130 remained on the public water supply and those properties located north of the Site along Route 130 had been periodically monitored to ensure that site-related contaminants had not impacted their drinking water. Therefore, the Five-Year Reviews concluded that short-term protectiveness of human health and the environment was achieved as there is no exposure to groundwater contamination and ongoing groundwater monitoring continues to be performed.

The decreased contaminant concentrations observed in the 1997 Phase I and 1998 Phase II groundwater evaluations, as well the groundwater monitoring data, including the most recent December 2010 data, indicate that the concentrations of COCs have significantly decreased over time. This is due in large part to source removal and natural attenuation processes. The data combined with the availability of newer remedial technologies, prompted the investigation into other potential groundwater remedies that may be more efficient for the Site than the pump and treat remedy selected in the 1994 OU1 ROD in addressing the current concentrations of contaminants in the groundwater observed at the Site.

SUMMARY OF SITE RISKS

The purpose of the risk assessment is to identify potential cancer risks and non-cancer health hazards at the Site assuming that no further remedial action is taken. A baseline risk assessment was conducted as part of the Site RI and was based on COC concentrations from groundwater samples collected in 1989. The baseline risk assessment addressed the potential risks to human health by identifying potential exposure pathways by which the public may be exposed to contaminated groundwater (via ingestion). Groundwater exposures were assessed for both potential present and future land-use scenarios. Current land use was considered to be an industrial facility and future land use was characterized as either an industrial facility or residential area in the risk assessment. Current receptors included off-site residents (child and adult) and off-site workers. Future receptors included on-site residents (child and adult), off-site residents (child and adult), on-site workers and off-site workers. Results of the quantitative risk assessment concluded that there was an unacceptable risk for the potential future receptors due to exposure to contaminated groundwater via ingestion, with the exception of the on-site worker.

The potential exposure pathways, land-use scenarios and receptors identified in the 1990 risk assessment remain applicable for the Site; therefore, the original risk assessment is still valid. An ecological risk assessment was also conducted in 1992. It was determined that the two media potentially posing a risk to ecological receptors were the stream sediment and wetland soils. Groundwater was not found to be posing a significant ecological risk.

The unconfined aquifer at the site is classified as a Class II aquifer in the state of New Jersey. The designated use of a Class II aquifer is to provide potable water and this is considered to be the most beneficial use for the aquifer. Accordingly, while the groundwater at the site is not currently being used for drinking water, the goal is to restore the aquifer to its most beneficial use.

A review of the most recent groundwater data reveals that the concentrations of COCs, primarily cadmium and lead, continue to exceed their respective NJDEP Groundwater Quality Criteria and Federal Maximum Contaminant Levels. These standards were promulgated to ensure that public water systems used as potable water sources remain protective of human health by limiting levels of contaminants in the drinking water. The RAO for the Site is to restore the site-related contaminated portions of the unconfined aquifer to drinking water standards for all contaminants; this RAO has not been met for all of the constituents. Therefore, unacceptable human health risk to a potentially exposed population from direct exposure to groundwater remains. It is EPA's current judgment that a remedy is required to restore groundwater to its most beneficial use and achieve the RAOs, and is necessary in order to protect human health and the environment.

REMEDIAL ACTION OBJECTIVES

RAOs are goals for reducing human health and environmental risks and/or meeting established regulatory requirements at the Site. Applicable or Relevant and Appropriate Requirements (ARARs) were used to define RAOs. Based on current data and evaluations of potential risk, lead and cadmium in groundwater were identified as being the primary COCs. However, Table A of the 1994 ROD (EPA, 1994) for the Site lists arsenic, beryllium, lead, 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethylene (1,1-DCE), PCE, and vinyl chloride (VC) as the COCs in groundwater. Cadmium is also considered to be a COC because of its presence in groundwater at concentrations that exceed applicable New Jersey groundwater standards. The primary risk to human health at the Site is through potential ingestion of affected groundwater.

RAOs for groundwater at the Site include the following:

- Restore the contaminated unconfined aquifer to drinking water standards for all contaminants;
- Minimize the potential for migration of the contaminants of concern in groundwater; and
- Prevent or minimize potential current and future human exposures; including ingestion of groundwater, that presents a significant risk to public health and the environment.

For the purpose of evaluating an alternative groundwater remedy for the Site, focus was placed on the primary COCs, lead and cadmium, in driving the remedy selection process. Achievement of the cleanup standards for lead and cadmium is anticipated to result in the achievement of cleanup standards for other COCs, as all of the COCs are subject to declining concentrations in groundwater by both natural attenuation and remedial activities.

While lead and cadmium are the primary COCs, the groundwater remedy will not be considered complete until all Site-related constituents have concentrations that meet the applicable standards. However, it is expected that all other Site-related constituents will meet the applicable standards within the timeframe required to remediate lead and cadmium. The criteria used to evaluate achievement of the RAOs for lead and cadmium are based on the most stringent of the current state and federal standards. For lead and cadmium, the most stringent standards are the New Jersey Groundwater Quality Standards (NJGWQSs) (NJAC 7:9C) which are 5 parts per billion (ppb) for lead and 4 ppb for cadmium. All other groundwater COCs will continue to be evaluated concurrent with the remedy implementation.

DESCRIPTION OF REMEDIAL ALTERNATIVES

CERCLA, 42 U.S.C. §9601 et seq., requires that each remedial alternative be protective of human health and the environment, be cost effective, comply with other statutory laws, and utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. In addition, CERCLA includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility or volume of hazardous substances.

CERCLA requires that if a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, EPA must review the action no less than every five years after initiation of the action. In addition, institutional controls (e.g., a deed notice, an easement or a covenant) to limit the use of portions of the property may be required. These use restrictions are discussed in each alternative as appropriate. Consistent with expectations set out in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), none of the remedies rely exclusively on institutional controls to achieve protectiveness. The time frames below for achieving RAOs do not include the time for remedial design or the time to procure contracts.

As previously mentioned, this ROD Amendment is only for the groundwater component of the 1994 OU1 ROD. The soil/sediment component, and all other components of the OU1 ROD remain the same.

Alternative 1 – No Action

Total Capital Cost	$0
Operation and Maintenance	$0
Total Present Net Worth	$0
Timeframe	0 years

The No Action alternative was retained for comparison purposes as required by the NCP. Under the No Action Alternative, no remedial actions would be taken to address groundwater contamination. Institutional and engineering controls would not be implemented to restrict the use or access to contaminated groundwater. Furthermore, there would be no monitoring associated with this alternative to evaluate progress toward achieving the RAOs.

Alternative 2 – Monitored Natural Attenuation Plus Institutional Controls

Total Capital Cost	$163,399
Operation and Maintenance	$1,049,805
Total Present Net Worth	$1,213,204
Timeframe	>50 years

In this alternative, Monitored Natural Attenuation (MNA), natural attenuation processes would be used to achieve the Site-specific remediation objectives. Natural attenuation processes include biochemical reactions, dispersion, dilution and sorption processes that occur naturally in the subsurface and serve to reduce contaminant levels from groundwater at the Site. Adsorption appears to be the primary mechanism of MNA attributing to decreased contaminant concentrations at the Site. This is mainly attributable to pH levels at the Site. The pH was initially lowered due to the battery acids that were released on-site as a result of the NL Industries, Inc. facility operations. After removal of contaminant source material, the pH began to equilibrate and rise over time toward the natural pH range of 5-6 for groundwater at the Site. The increased pH fosters natural sorption reactions in the aquifer. The MNA alternative would also include a monitoring plan to track contaminant concentrations and determine when the cleanup standards have been achieved. Furthermore, this alternative would include the implementation of institutional controls, such as a Classification Exception Area (CEA), to limit potential future use of impacted groundwater at the Site. This would protect human health and the environment until cleanup standards are achieved.

Alternative 3 – Reagent Injection Plus Institutional Controls

Total Capital Cost	$890,489
Operation and Maintenance	$684,766
Total Present Net Worth	$1,575,255
Timeframe	<10 years

Reagent injection involves the introduction of a reagent into the aquifer using injection wells or well points. The reagent injection technique is based on the fact that metals dissolved or entrained in groundwater will react to form insoluble compounds and precipitate, or otherwise be immobilized by adsorption onto a substrate and/or by incorporating the metal into a molecular structure (intercalation) which may then adsorb or become incorporated into the soil as a complex or precipitate. Based on preliminary bench-scale treatability studies, it appears that phosphate reagents would be highly effective at binding both lead and cadmium in less soluble metal complexes in the groundwater. Current Site pH values are largely in the range of pH 4 – 5. A more alkaline environment (pH of approximately 8.0 – 9.0) would be created through addition of a basic compound to promote reactions between the native metals and the soil. This increased pH value is not required to be maintained following reagent injection and pH would return to ambient levels (pH 5.0 – 6.0) over time. The reagent (likely phosphate) would then be introduced to promote intercalation reactions to permanently remove lead and cadmium from the groundwater. This remedial alternative would also include continued monitoring of all COCs, including site-related VOCs. The low concentrations of VOCs observed in recent groundwater monitoring data are expected to continue to decrease to acceptable levels.

Effectiveness of this remedial alternative would be assessed by periodic groundwater sampling and analysis to ensure that cleanup goals are achieved for all COCs. This alternative would also include implementation of institutional controls, such as a CEA, to limit potential future use of impacted groundwater at the Site. This would protect human health and the environment until cleanup standards are achieved.

Alternative 4 – Pump & Treat Plus Institutional Controls

Total Capital Cost	$1,560,298
Operation and Maintenance	$4,128,108
Total Present Net Worth	$5,688,406
Timeframe	>50 Years

In this alternative, a well system would be used to extract contaminated groundwater, which would be pumped into a treatment plant that would be constructed on-site. This was the remedy selected in the 1994 ROD and is presented here again for the purpose of comparing this remedy to the other alternatives. The treatment steps initially described in the 1994 ROD included a 250 gallon per minute pump rate and precipitation/flocculation followed by an ion-exchange polishing step. Following treatment, the water would be pumped, via a pipeline, to the Delaware River and discharged. An effluent outfall would be constructed at the discharge location. The distance from the Site to the Delaware River is approximately 1.5 miles.

Effectiveness of the pump and treat alternative would be assessed by periodic groundwater sampling and analysis. This alternative would also include implementation of institutional controls, such as a CEA, to limit potential future use of impacted groundwater at the Site. This would protect human health and the environment until cleanup standards are achieved.

COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy, EPA considered the factors set out in CERCLA §121, 42 U.S.C. §9621, by conducting a detailed analysis of the viable remedial response measures pursuant to the NCP, 40 CFR §300.430(e)(9) and OSWER Directive 9355.3-01. The detailed analysis consisted of an assessment of the individual response measure against each of nine evaluation criteria described below and a comparative analysis focusing upon the relative performance of each response measure against the criteria.

Threshold Criteria - *The first two criteria are known as "threshold criteria" because they are the minimum requirements that each response measure must meet in order to be eligible for selection as a remedy.*

1. **Overall Protection of Human Health and the Environment**

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

Alternative 1, No Action, is not protective of human health and the environment because this alternative does not include implementation of institutional controls to restrict the use of contaminated groundwater and does not include monitoring to determine when the applicable standards have been met and the RAOs have been achieved. Alternative 2 – MNA Plus Institutional Controls, Alternative 3 – Reagent Injection Plus Institutional Controls and Alternative 4 – Pump and Treat Plus Institutional Controls are all protective of human health and the environment as they will all result in the decrease of Site-related contaminants, include institutional controls to restrict groundwater usage until clean-up goals have been achieved and they all include a monitoring plan to determine when the RAOs have been achieved. However, Alternatives 2, 3 and 4 are estimated to achieve the cleanup standards in varying lengths of time.

2. **Compliance with applicable or relevant and appropriate requirements (ARARs)**

Section 121(d) of CERCLA and NCP §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4).

The three broad categories of ARARs include chemical-specific, location-specific and action-specific ARARs. ARARs have been established for groundwater as part of the OU1 remedial action objective to restore the unconfined aquifer to drinking water standards. A listing of these ARARs is provided below.

<u>Potential Chemical-Specific ARARs</u>

Federal

- Clean Water Act, Water Quality Criteria
- RCRA Ground Water Protection Standards (40 CFR Part 264.94)
- Federal Water Quality Criteria (51 *Federal Register* 436665)
- Federal MCLs

New Jersey

- New Jersey Ground Water Quality Standards (NJGWQS) (NJAC 7:9-6)
- New Jersey MCLs
-

<u>Potential Action-Specific ARARs</u>

Federal

- RCRA Groundwater Monitoring and Protection Standards (40 CFR 264, Subpart F)

- Clean Water Act – NPDES Permitting Requirements for Discharge of Treatment System Effluent (40 CFR 122-125)
- EPA Action Level for Lead in Drinking Water

New Jersey

- New Jersey Pollutant Discharge Elimination System Regulations (NJPDES) and Effluent Limitations (NJAC 7:14A et seq)

Potential Location-Specific ARARs

Federal

- Fish and Wildlife Coordination Act (16 USC 661 et seq.)
- National Environmental Policy Act (42 USC 4341 et seq.)
- Natural Historic Preservation Act
- Endangered Species Act
- Coastal Zone Management Act
- Farmland Protection Policy Act

New Jersey

- New Jersey Rules on Coastal Resources and Development (7:7E-1.1 et seq.)
- New Jersey Freshwater Wetlands Regulation

Alternative 1, No Action, would not comply with ARARs since a determination as to whether or not the applicable standards have been met would not be able to be made due to the lack of monitoring. Alternatives 2, 3 and 4 are expected to comply with the applicable ARARs; however, Alternative 4 would have more applicable ARARs, compared to Alternatives 2 and 3, due to the construction of the groundwater treatment plant and discharge of treated water (NJPDES requirements, construction permits, etc.).

Primary Balancing Criteria *- The next five criteria, criteria 3 through 7, are known as "primary balancing criteria". These criteria are factors with which tradeoffs between response measures are assessed so that the best option will be chosen, given site-specific data and conditions.*

3. **Long-term Effectiveness and Permanence**

A similar degree of long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain on-site following remediation and the adequacy and reliability of controls.

Alternative 1, No Action, does not provide a mechanism to monitor contaminant migration or attenuation; therefore long-term effectiveness and permanence cannot be determined. Alternative 2 – MNA Plus Institutional Controls, Alternative 3-Reagent Injection Plus Institutional Controls and Alternative 4-Pump and Treat Plus Institutional Controls are all expected to mitigate long-term risks from Site contaminants; however, for each alternative, the timeframes and mechanisms for achieving the cleanup goals vary significantly.

Alternative 2 relies on natural attenuation processes to remove lead and cadmium from the groundwater. These processes occur through cation exchange or precipitation, if the pH conditions required for precipitation are present (higher pH values). Therefore, as the pH at the site naturally equilibrates toward ambient pH values (between pH 5 and pH 6) increasing amounts of lead and cadmium will precipitate out of the groundwater. Once a precipitate is formed, it may directly adsorb to the aquifer matrix and render the contaminant immobile. Studies referenced in the Focused Feasibility Study for Groundwater Remediation (FFS) demonstrated the presence of iron and manganese oxide/hydroxide coatings on soil particles in the subsurface at the Site. The iron and manganese oxide/hydroxide coatings provide adsorption sites in the soil for lead and cadmium. The results of the Phase II evaluation, described in the Site History Section above, documented that the aquifer soil has more than enough capacity to adsorb the remaining lead and cadmium present in groundwater at the Site. The stability of the immobilized constituents is directly related to the pH and Eh of groundwater at the Site and the geochemical reactions that occur. The Phase II study included a sequential extraction analysis. This analysis used sequentially more acidic solutions to extract cadmium and lead from the soil samples provided. The study concluded that a solution with a pH of less than 2 was needed to extract cadmium and lead from the soil samples at detectable concentrations. The study verifies that after adsorption of lead and cadmium onto soil, it would be reasonably permanent because conditions causing an ambient groundwater pH of 2 or less are very unlikely to occur at the Site.

The Alternative 3 reagent injection technology removes cadmium and lead from solution through a process that is more complex than that described above for Alternative 2. With Alternative 3, lead and cadmium are precipitated out of solution through the formation of metal phosphates (phosphate was identified as the likely reagent based on a Bench Scale Treatability Study but would be confirmed in a Pilot Study). In this process, a host crystal, is formed in solution and the target metal is incorporated into the host crystal and simultaneously rendered insoluble and inert and the crystal structure is incorporated within the native rock. In order to foster this more complex reaction, Alternative 3 requires an initial pH adjustment of the groundwater to create a more alkaline environment (pH of approximately 8.0 to 9.0) through the addition of a basic compound to promote the desired reaction between the primary COCs and the aquifer soils. Prior to the injection of reagents a basic solution, such as sodium hydroxide, can be used to increase the pH of the groundwater in localized areas to promote subsequent removal of lead and cadmium from groundwater when the reagent is injected. The increased pH value is not required to be maintained following reagent injection and will naturally return to ambient levels (i.e., pH of approximately 5.0 to 6.0) over time. The ambient pH will not cause any significant resolubilization of lead or cadmium after the metals have reacted to form metal phosphate compounds and/or these phosphate compounds have adsorbed to the aquifer materials.

Alternative 4 – Pump and Treat technology involves pumping groundwater from the contaminated unconfined aquifer into a treatment plant where a series of process steps, including precipitation/flocculation followed by an ion-exchange polishing step, would remove the contaminants from the groundwater. Treated groundwater would then be directly discharged to the Delaware River via a pipeline.

Alternative 2-MNA and Alternative 4-Pump and Treat would be effective in the long term but would require significantly longer periods of time to meet the applicable standards compared to Alternative 3 – Reagent Injection.

4. **Reduction of Toxicity, Mobility, or Volume of contaminants through Treatment**

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Groundwater concentrations of Site-related contaminants have generally decreased over time, as evidenced through the groundwater monitoring events. Furthermore, there has been minimal migration of the impacted groundwater. All alternatives, with the exception of Alternative 1 – No Action, are expected to reduce the toxicity, mobility or volume of contaminants to meet the applicable standards; however, the alternatives are estimated to achieve these reductions at different rates and through different mechanisms. Alternative 2 – MNA Plus Institutional Controls and Alternative 3 – Reagent Injection Plus Institutional Controls both utilize natural processes, including biochemical reactions, dispersion, dilution and sorption; however, Alternative 3 includes the enhanced formation of metal phosphates which further removes lead and cadmium from groundwater.

5. **Short-term Effectiveness**

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

Alternative 1 – No Action, has no impact on short-term effectiveness. Alternative 2 – MNA and Alternative 3 – Reagent Injection are expected to have minimal impacts on remediation workers and nearby residents during remedy implementation. Alternative 2 – MNA involves the installation of monitoring wells and Alternative 3 – Reagent injection involves the installation of monitoring wells and injection points for in-situ treatment of the contaminated groundwater. Alternative 4 – Pump and Treat involves ex-situ treatment of contaminated groundwater through the construction of a groundwater treatment plant which is anticipated to take longer to construct, would be more intrusive, and have more short-term impacts related to construction.

The potential risks to Site workers and area residents during remedy implementation for each alternative could be addressed by adherence to protective worker practices, safety standards, and equipment. A Site-specific health and safety plan will be prepared and trained personnel will perform remedial activities. Appropriate personnel monitoring and emission controls and monitoring will be provided, as needed, during remedy implementation.

Alternative 2 – MNA Plus Institutional Controls and Alternative 4 – Pump and Treat Plus Institutional Controls are expected to take over 50 years to reduce the contaminant levels to concentrations meeting the applicable standards. Alternative 3 – Reagent Injection Plus Institutional Controls is expected to reduce contaminant levels to concentrations meeting the applicable standards in less than 10 years. This increased rate of reduction of toxicity, mobility and volume is due to the mechanisms in which the primary contaminants of concern, lead and cadmium, will be removed from solution.

6. **Implementability**

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

All of the alternatives are technically and administratively feasible, have been implemented at other similar sites, and make use of standard engineering practices. Alternative 1 - No Action requires the least effort to implement; however, without having the monitoring component to determine effectiveness of the remedy, it would not demonstrate when RAOs have been met.

Alternative 2 – MNA Plus Institutional Controls would be the most readily implementable alternative as it only involves installation of monitoring wells and subsequent monitoring. Alternative 3 – Reagent Injection would require a pilot study to optimize its effectiveness as well as the installation of monitoring and injection wells. Alternative 4 – Pump and Treat Plus Institutional Controls would be the most difficult to implement as it would require the greatest degree of construction and acquisition of permits, such as the NJPDES permit for off-site discharge of the treated groundwater. The availability of service and materials required for the implementation of all alternatives is adequate. All alternatives, other than Alternative 1, require services and materials that are currently readily available from technology vendors, and are therefore, not expected to present a challenge to remedy implementation.

7. **Cost**

Includes estimated capital and operation and maintenance costs, and net present-worth values.

Alternative 1 - No Action has the lowest capital cost, but because of the lack of monitoring, achievement of remedial success could not be measured. Aside from Alternative 1 – No Action, Alternative 2 - MNA Plus Institutional Controls has the lowest capital cost of $163, 399 and would be the least costly alternative to implement with a total present net worth of approximately $1.2 million which includes a 30-year groundwater monitoring program and well installation. Alternative 3 – Reagent Injection Plus Institutional Controls is estimated to have a capital cost of $890,489 and an overall present net worth cost of approximately 1.6 million assuming a 10-year groundwater monitoring program. This is comparable to the cost of Alternative 2. Alternative 4 – Pump and Treat Plus Institutional Controls is the most expensive alternative with an estimated capital cost of $1.6 million and a present net worth cost of approximately $5.7 million which includes a 30-year groundwater monitoring program.

Modifying Criteria *- The final two evaluation criteria, criteria 8 and 9, are called "modifying criteria" because new information or comments from the state or the community on the Proposed Plan may modify the preferred response measure or cause another response measure to be considered.*

8. **State Acceptance**

Indicates whether based on its review of the RI/FS reports and the Proposed Plan, the state supports, opposes, and/or has identified any reservations with the selected response measure.

The State of New Jersey concurs with EPA's Selected Remedy.

9. **Community Acceptance**

Summarizes the public's general response to the response measures described in the Proposed Plan and the RI/FS reports. This assessment includes determining which of the response measures the community supports, opposes, and/or has reservations about.

EPA solicited input from the community on the remedial alternatives proposed for the Site. The community was generally supportive of EPA's Proposed Plan for the ROD Amendment. Appendix III, The Responsiveness Summary, addresses the comments received at the public meeting and written comments received during the public comment period.

PRINCIPAL THREAT WASTE

Principal threat wastes are considered source materials, i.e., materials that include or contain hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or as a source for direct exposure. This ROD Amendment addresses groundwater contamination. Contaminated groundwater generally is not considered to be a source material and is therefore not categorized as a "principal threat."

SELECTED REMEDY

Based upon consideration of the results of groundwater investigations at the Site, the requirements of CERCLA, the detailed analysis of the remedial alternatives and public comments, EPA has determined that Alternative 3 – Reagent Injection Plus Institutional Controls is the appropriate remedy for the treatment of contaminated groundwater at the Site. This remedy best satisfies the requirements of CERCLA Section 121 and the NCP's nine evaluation criteria for remedial alternatives, 40 CFR §300.430 (e) (9). This remedy includes the following components:

- In-situ pH adjustment and reagent injection for the contaminated unconfined aquifer via injection wells;
- Monitoring of groundwater; and
- Implementation of institutional controls to restrict the use of contaminated groundwater until clean-up goals are achieved.

Reagent Injection is an in-situ treatment whereby a reagent is injected into the groundwater aquifer via injection wells or well points. The reagent to be applied will be selected based upon the results of the bench-scale treatability study (BSTS), as presented in the FFS, and a field pilot study, which will be conducted as part of the Remedial Design. Preliminarily, the results of the BSTS reveal that phosphate reagents will be highly effective for treating lead and cadmium in groundwater. The use of phosphates for treating impacted soils and waters has been widely used to immobilize inorganic constituents, including lead. Note that many of the available reagents are commonly used in water treatment applications. For example, trisodium polyphosphate (TSPP) is used in drinking water systems and has been found to have no deleterious environmental impacts. However, one of the goals of pilot testing will be to determine the amount of reagent required to minimize unreacted phosphate. The field pilot study will confirm effectiveness at the Site and assist in calculating parameters required for successful remediation (i.e., number of well points, spacing, application method, etc.).

The reagent injection technique is based on the fact that metals dissolved or entrained in groundwater may react to form insoluble compounds and precipitates, or otherwise be immobilized by adsorption onto a substrate (i.e., the native soil) and/or by incorporating the metal into a molecular structure (intercalation) which may then adsorb or become incorporated into soil as a complex or precipitate. Reactions with phosphates tend to result in intercalation under proper conditions.

Currently, groundwater within the contaminated unconfined aquifer has a pH range of 4.0 to 5.0. In order to promote the desired reactions, a more alkaline environment (pH of approximately 8.0 – 9.0) will be created prior to the reagent injection through addition of a basic compound into the groundwater aquifer to foster reactions between the native metals and the soil. The reagent will then be injected into the groundwater aquifer via a number of injection points. In this process, a host crystal is formed in solution and the target metal (lead or cadmium) is incorporated into the host crystal and simultaneously rendered insoluble and inert and the crystal structure is incorporated within the native rock of the aquifer. The increased pH value is not required to be maintained following reagent injection and will naturally return to ambient levels (i.e., pH of approximately 5.0 to 6.0) over time. The ambient pH will not cause any significant resolubilization of lead or cadmium after the metals have reacted to form metal phosphate compounds and/or these phosphate compounds have adsorbed to the aquifer materials. Therefore, the precipitate will remain stable over time. Generally speaking, precipitation reactions, such as those induced through certain injection reagents, including phosphates, follow a kinetic order of reaction. The order of reaction varies from compound to compound and with the geochemical conditions in which the reagent is applied (e.g., pH and reagent concentration); however, with the current Site conditions and concentrations of lead and cadmium in groundwater, it is anticipated that lead and cadmium will react with the phosphates first, followed by the non-target compounds (i.e., calcium and aluminum). This remedial alternative will also include continued monitoring of all COCs initially listed in the 1994 ROD, including site-related VOCs. EPA will assess the concentrations of the other site COCs throughout the implementation of the remedy and at the conclusion of the in-situ remedial action to address the primary COCs of lead and cadmium. If, at the conclusion of the remedy, the levels for these residual COCs continue to exceed cleanup standards, EPA will develop a strategy to address this issue.

The effectiveness of the remedy will be assessed by periodic groundwater sampling and analysis. Quarterly sampling is proposed initially; however, the monitoring frequency will be modified based upon the data obtained during the pilot study and initial post-reagent injection monitoring events.

Institutional controls, including a CEA, will also be implemented to prevent exposure to contaminated groundwater until the cleanup standards have been achieved for all COCs.

This remedy is estimated to take less than 10 years to achieve the cleanup standards. Therefore, as per EPA policy, 5-Year Reviews will be performed until remedial goals are achieved.

The remedy was selected over other remedies because it is expected to achieve substantial and long-term risk reduction through treatment in the most efficient and timely manner.

Based on information currently available, EPA believes the Reagent Injection Plus Institutional Controls remedy meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. EPA expects the selected remedy will satisfy the statutory requirements of CERCLA Section 121(b); however, Alternative 4 – Pump and Treat Plus Institutional Controls will be retained as a contingency remedy.

Consistent with EPA Region 2's Clean and Green policy, EPA will evaluate the use of sustainable technologies and practices with respect to implementation of the selected remedy.

STATUTORY DETERMINATIONS

As previously noted, CERCLA Section 121(b)(1) mandates that a remedial action must be protective of human health and the environment, cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. CERCLA Section 121(b)(1) also establishes a preference for remedial actions that employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at a site. CERCLA Section 121(d) further specifies that a remedial action must attain a degree of cleanup that satisfies ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA Section 121(d)(4). For the reasons discussed below, EPA has determined that the Selected Remedy meets the requirements of CERCLA Section 121.

Protection of Human Health and the Environment

The Selected Remedy will adequately protect human health and the environment through the in-situ treatment of contaminated groundwater in the unconfined aquifer via reagent injection. This process will reduce lead and cadmium concentrations in groundwater to levels that meet the NJGWQS. Implementation of institutional controls will prevent exposure to contaminated groundwater by restricting its use until the cleanup goals are achieved for all COCs. Implementation of the Selected Remedy will not pose unacceptable short-term risks or adverse cross-media impacts.

Compliance with ARARs

The following ARARs have been determined to be potentially applicable to the Selected Remedy:

Potential Chemical Specific ARARs

Federal
- Clean Water Act, Water Quality Criteria
- RCRA Ground Water Protection Standards (40 CFR Part 264.94)
- Federal Water Quality Criteria (51 Federal Register 436665)
- Federal MCLs

State
- New Jersey Ground Water Quality Standards (NJGWQS) (NJAC7:9-6)
- New Jersey MCLs

Potential Action Specific ARARs

Federal
- RCRA Groundwater Monitoring and Protection Standards (40 CFR 264, Subpart F)
- EPA Action Level for Lead in Drinking Water

State
- New Jersey Pollutant Discharge Elimination System Regulations (NJPDES) and Effluent Limitations (NJAC 7:14A et seq)
- New Jersey Well Construction and Maintenance; Sealing of Abandon Wells N.J.A.C. 7:9D

Potential Location Specific ARARs

Federal
- Fish and Wildlife Coordination Act (16 USC 661 et seq.)
- National Environmental Policy Act (42 USC 4341 et seq.)
- Endangered Species Act
- Coastal Zone Management Act
- Farmland Protection Policy Act

State
- New Jersey Rules on Coastal Resources and Development (7:7E-1.1 et seq.)
- New Jersey Freshwater Wetlands Regulation

The Selected Remedy is compliant with all ARARs. With respect to the primary contaminants of concern, lead and cadmium, the NJGWQS are the most stringent of the chemical specific ARARS. The standards for lead and cadmium under these regulations are 5 ppb and 4 ppb, respectively. At the completion of the response action, the Selected Remedy will meet the identified ARARs, including the chemical specific ARARs for all COCs in groundwater.

Cost-Effectiveness

In EPA's judgment, the Selected Remedy is cost-effective and represents reasonable value for the money to be spent. Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility and volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness. The overall effectiveness of the Selected Remedy has been determined to be proportional to the costs, and the Selected Remedy, therefore, represents reasonable value for the money to be spent. The estimated present net worth cost of the Selected Remedy is $1,575,255.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

EPA has determined that the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Site. EPA has determined that the Selected Remedy provides the better balance of trade-offs with respect to the five balancing criteria. The Selected Remedy satisfies the criteria for long-term effectiveness and permanence by removing the primary COCs, cadmium and lead, from solution by precipitating them as metal phosphates. This technology removes the contaminants from solution and provides groundwater that
meets or exceeds the cleanup standards. The Selected Remedy, coupled with ongoing natural attenuation processes, is expected to meet cleanup standards for all COCs in the contaminated unconfined aquifer.

Since the Selected Remedy involves in-situ techniques, there are no significant short-term risks associated with the implementation of the remedy. However, with respect to exposure to contaminated groundwater, institutional controls will assure short-term protectiveness by preventing or minimizing potential current and future human exposures to the contaminated groundwater until the groundwater cleanup standards are achieved.

The Selected Remedy is implementable since it employs standard technologies that are readily available.

Preference for Treatment as a Principal Element

Through the use of an in-situ technology to treat the groundwater contamination, the Selected Remedy meets the statutory preference for the use of remedies that employ treatment that reduces toxicity, mobility or volume as a principal element to address the principal threats at the Sites.

Five-Year Review Requirements

Because the remedy will not result in hazardous substances, pollutants, or contaminants remaining above levels that allow for unlimited use and unrestricted exposure in groundwater, EPA anticipates that a five-year review will not be required for the groundwater remedy.

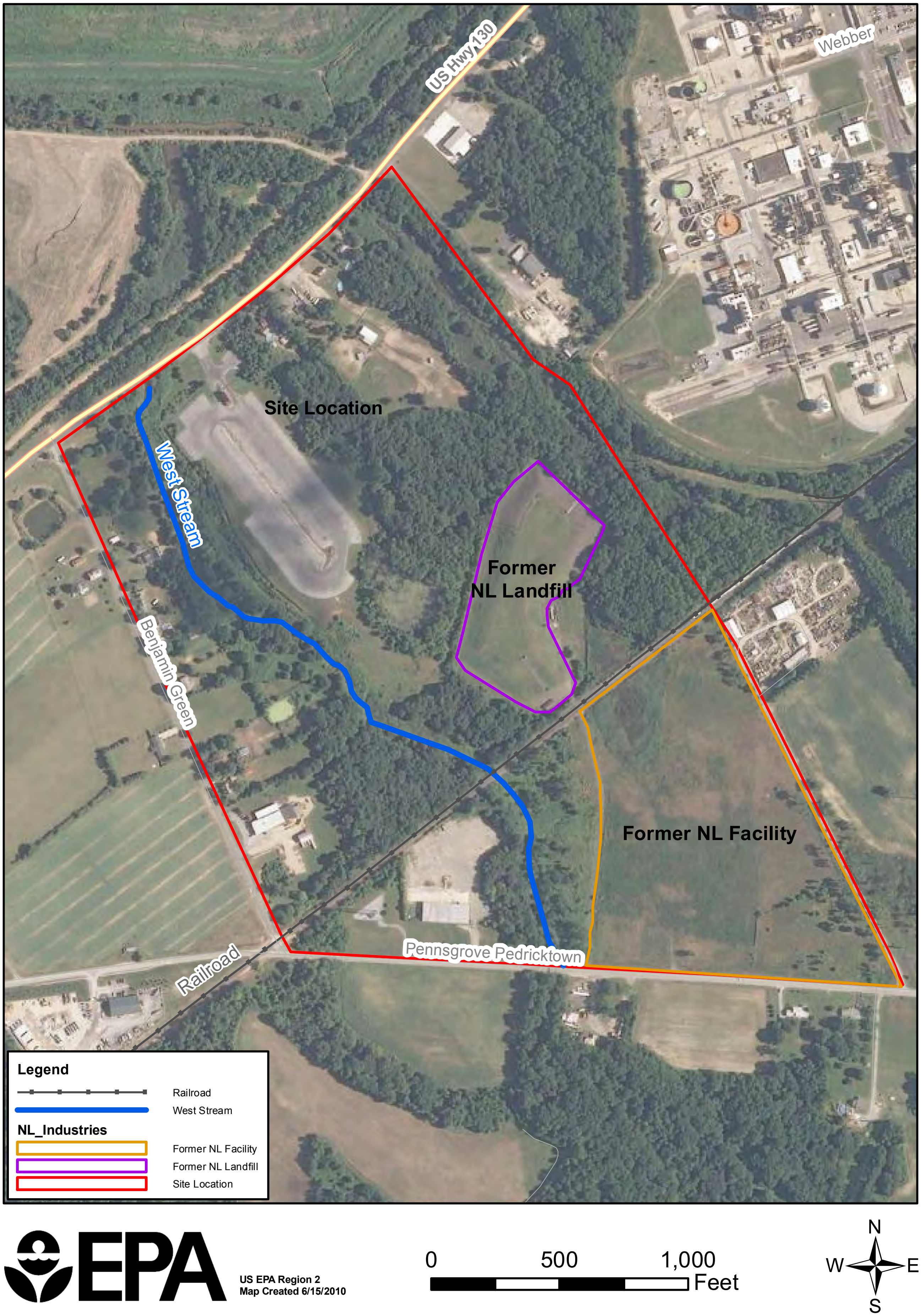
However, because it may take more than five years to attain remedial action objectives and cleanup levels for the groundwater at the Site, policy reviews will be conducted until the remediation goals are achieved to ensure that the groundwater remedy is, or will be, protective of human health and the environment.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for this ROD Amendment for the Site was released for public comment on June 22, 2011. The comment period closed on July 21, 2011. All verbal and written comments submitted during the public comment period were reviewed by EPA. Upon review of the comments, it was determined that no significant changes to the remedy, as was originally identified in the Proposed Plan, were necessary.

APPENDIX I - FIGURES

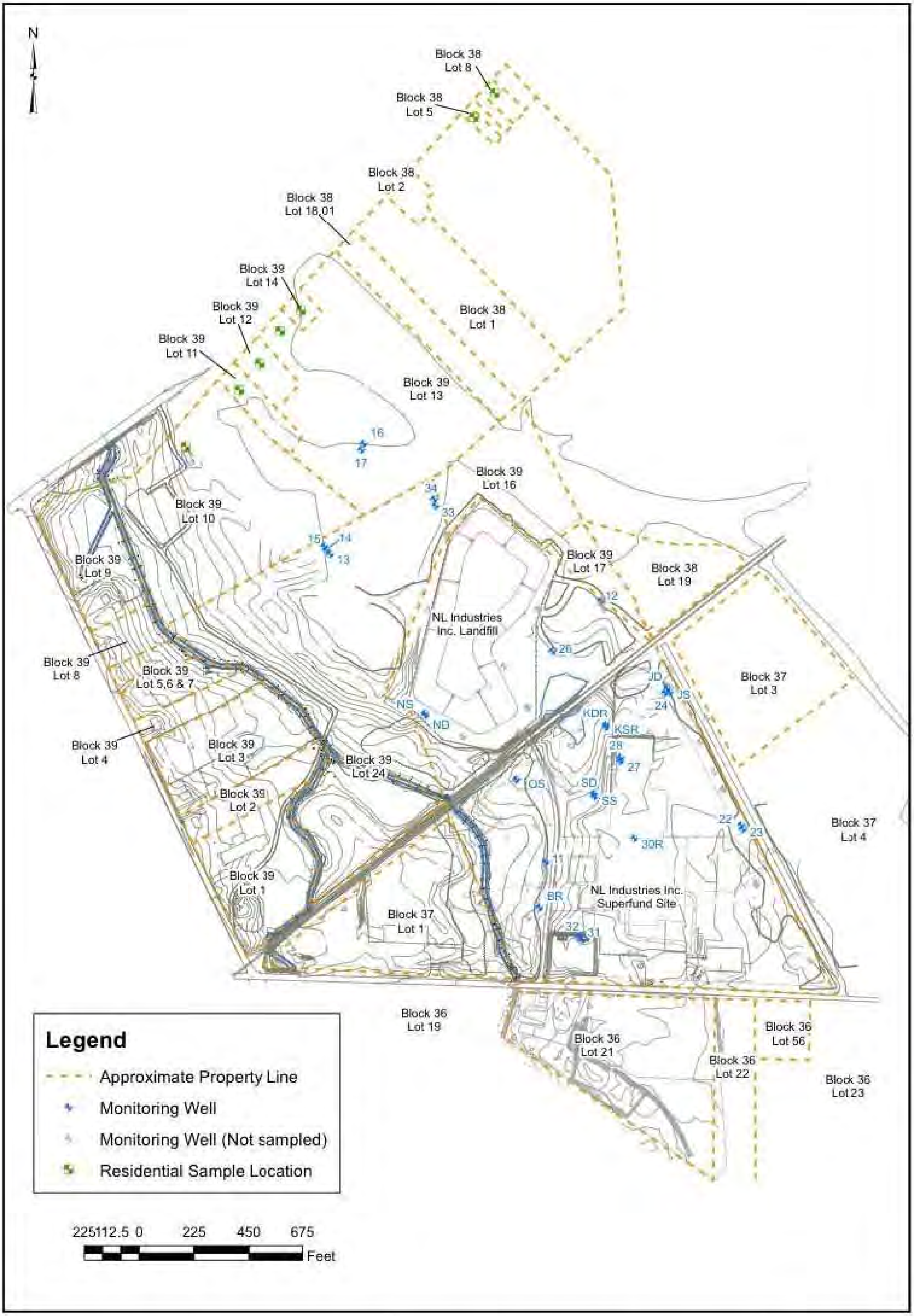
NL Industries Superfund Site
Pedricktown, NJ



EPA

US EPA Region 2
Map Created 6/15/2010

500442



CSI Environmental, LLC
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Annapolis, MD 21403
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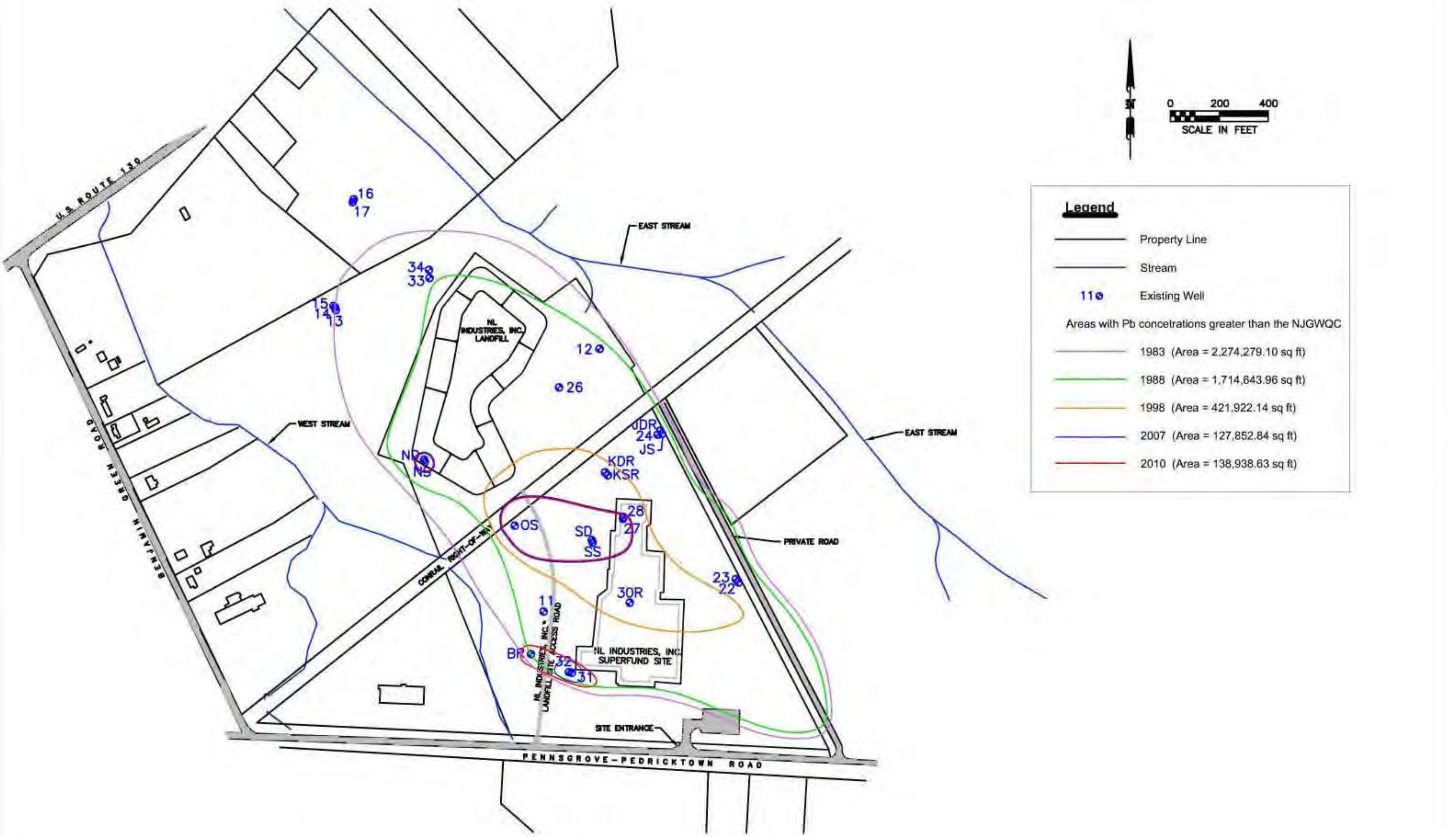
Monitoring Well
and Sample Locations
NL Industries, Inc. Superfund Site
Pedricktown, NJ

Figure
2

500443



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Drafter: M. Hickey

Approved By: J.D. Ferris

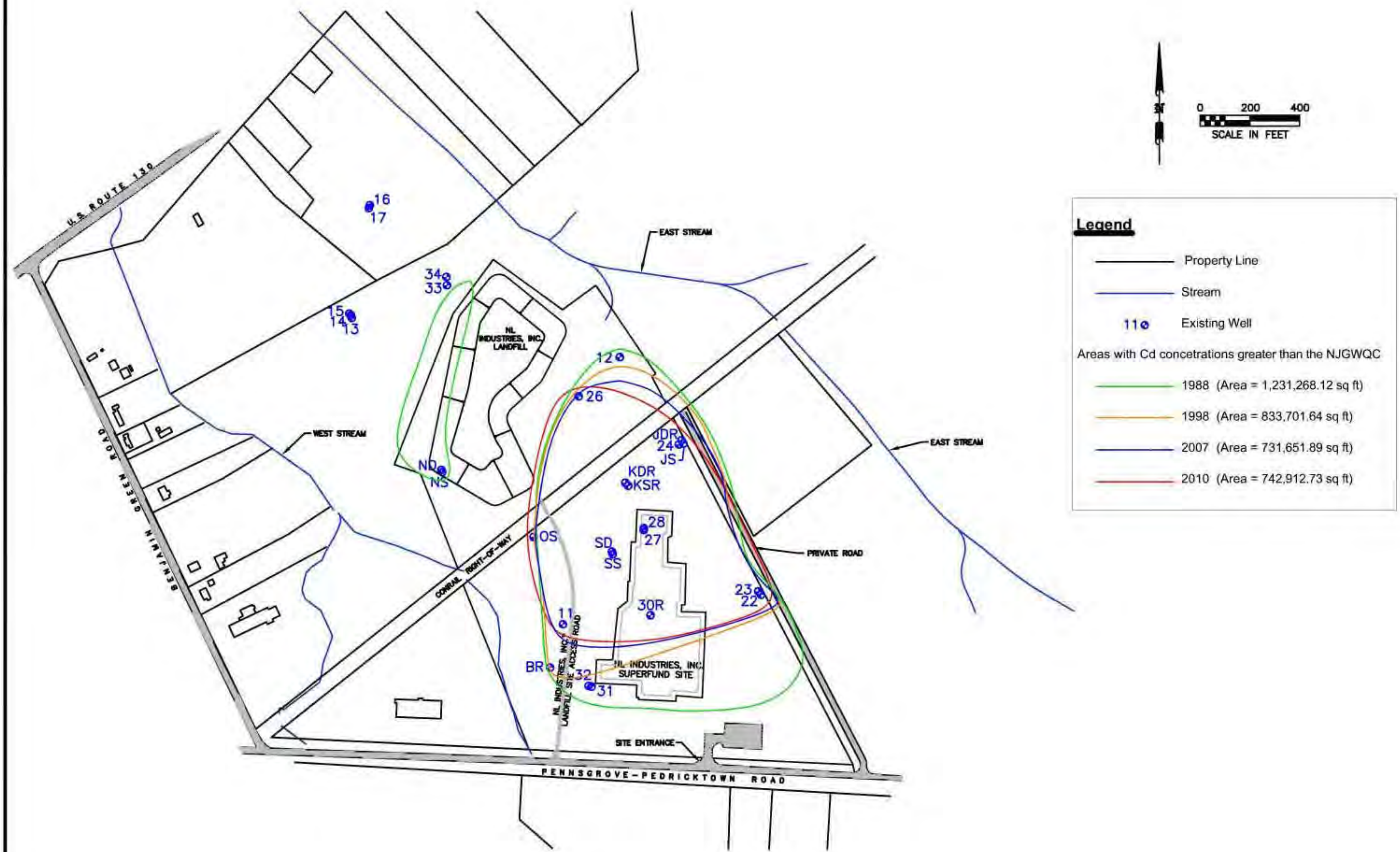
Prepared: 2/10/2011

HISTORICAL EXTENT OF LEAD CONCENTRATIONS ABOVE THE GROUNDWATER QUALITY STANDARD

NL Industries, Inc. Superfund Site
Pedricktown, NJ

500444

FIGURE 3



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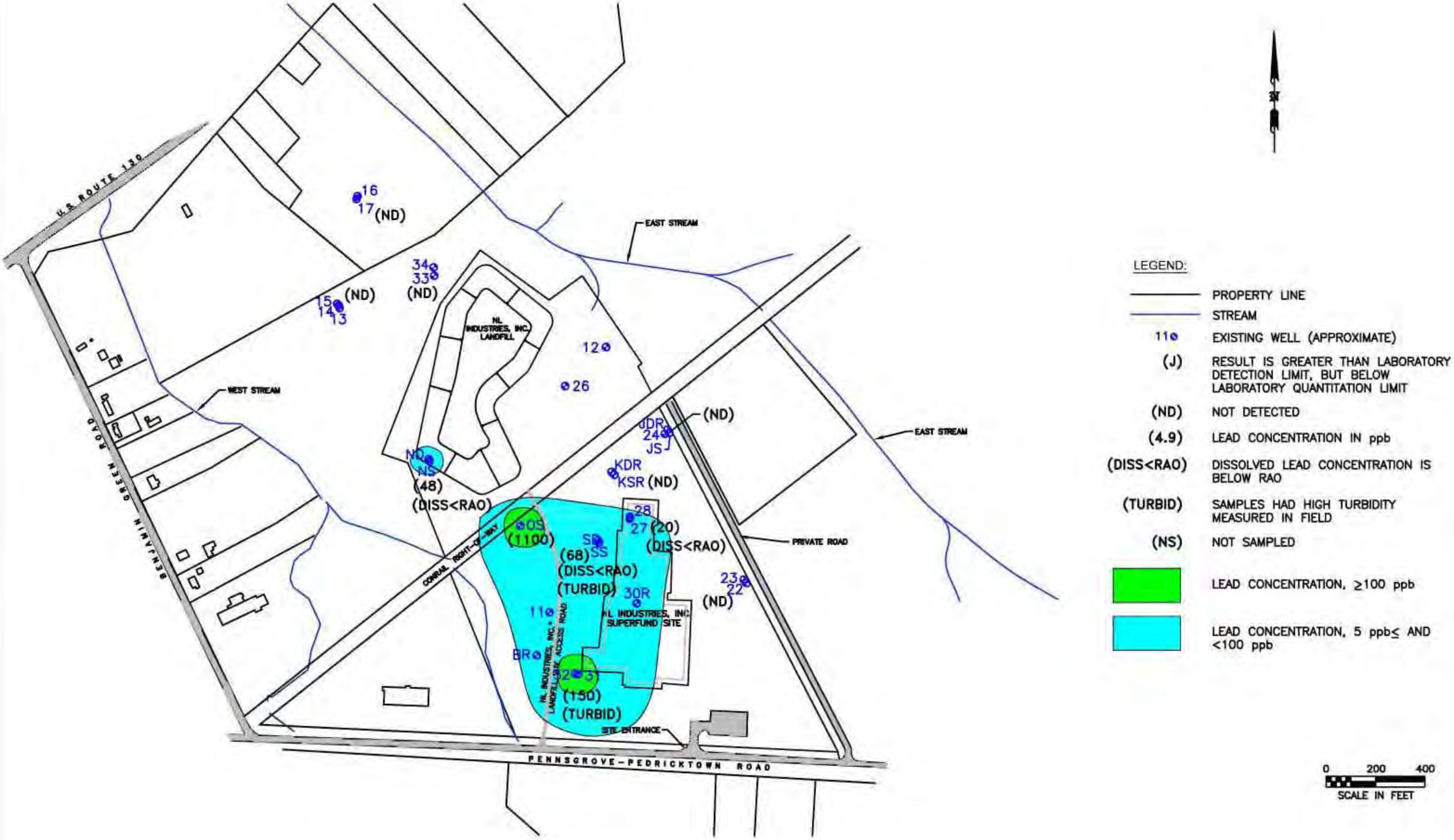
Prepared: 2/10/2011

HISTORICAL EXTENT OF CADMIUM CONCENTRATIONS ABOVE THE GROUNDWATER QUALITY STANDARD

NL Industries, Inc. Superfund Site
Pedricktown, NJ

FIGURE 4

500445



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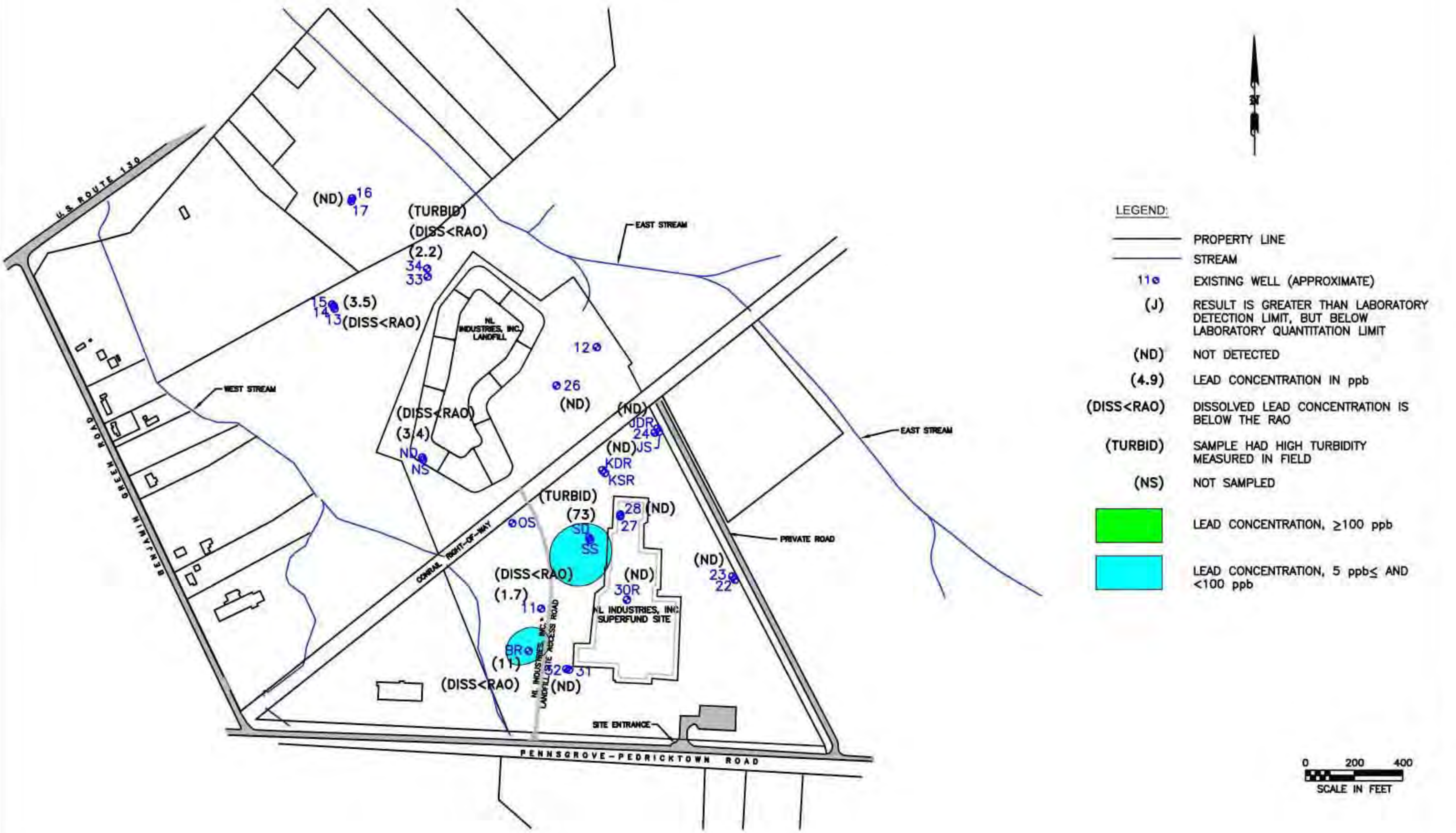
Prepared: 2/2/2011

Total Pb Distribution - Shallow Zone
November 2010

NL Industries, Inc. Superfund Site
Pedricktown, NJ

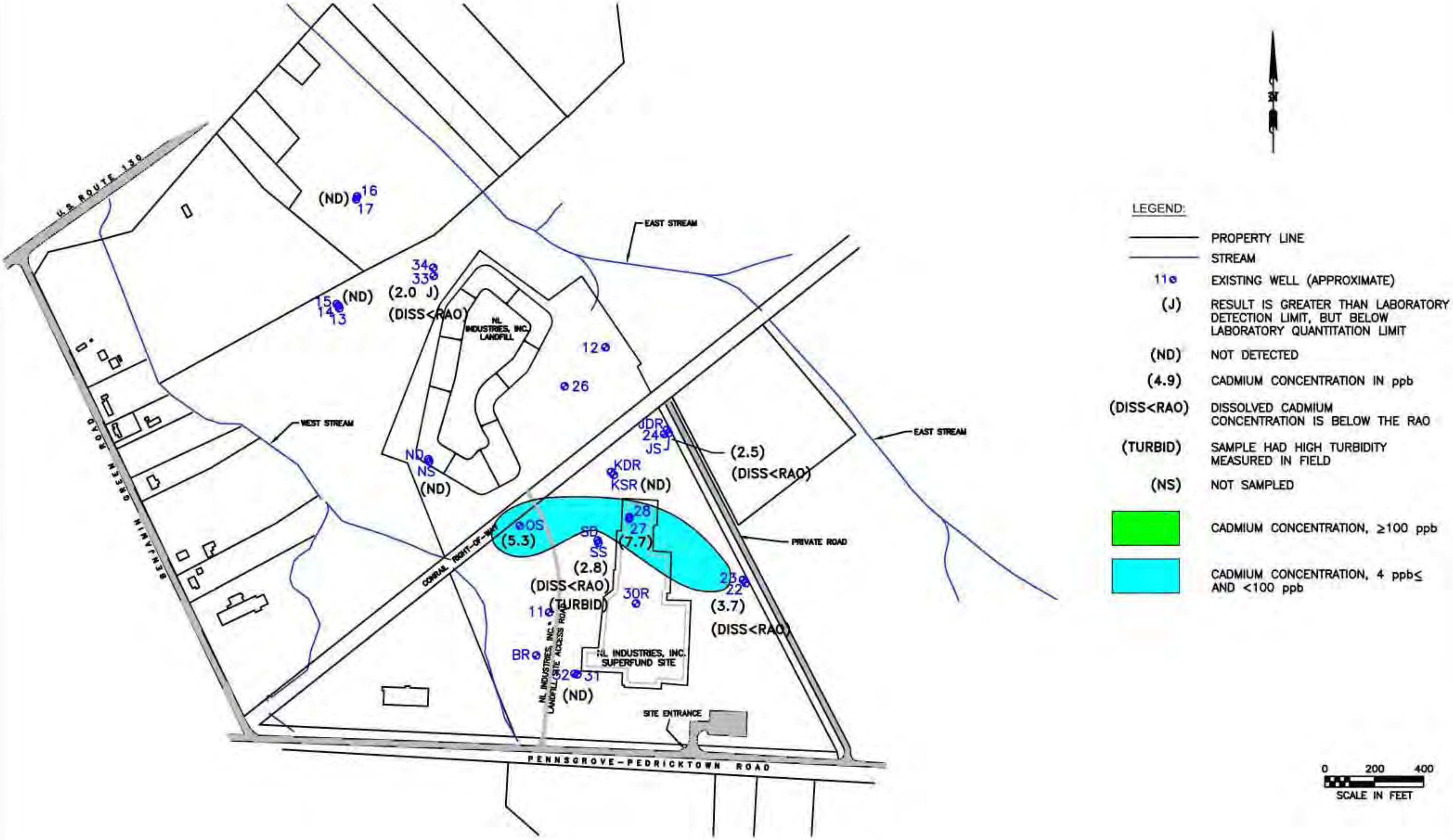
500446

FIGURE 5



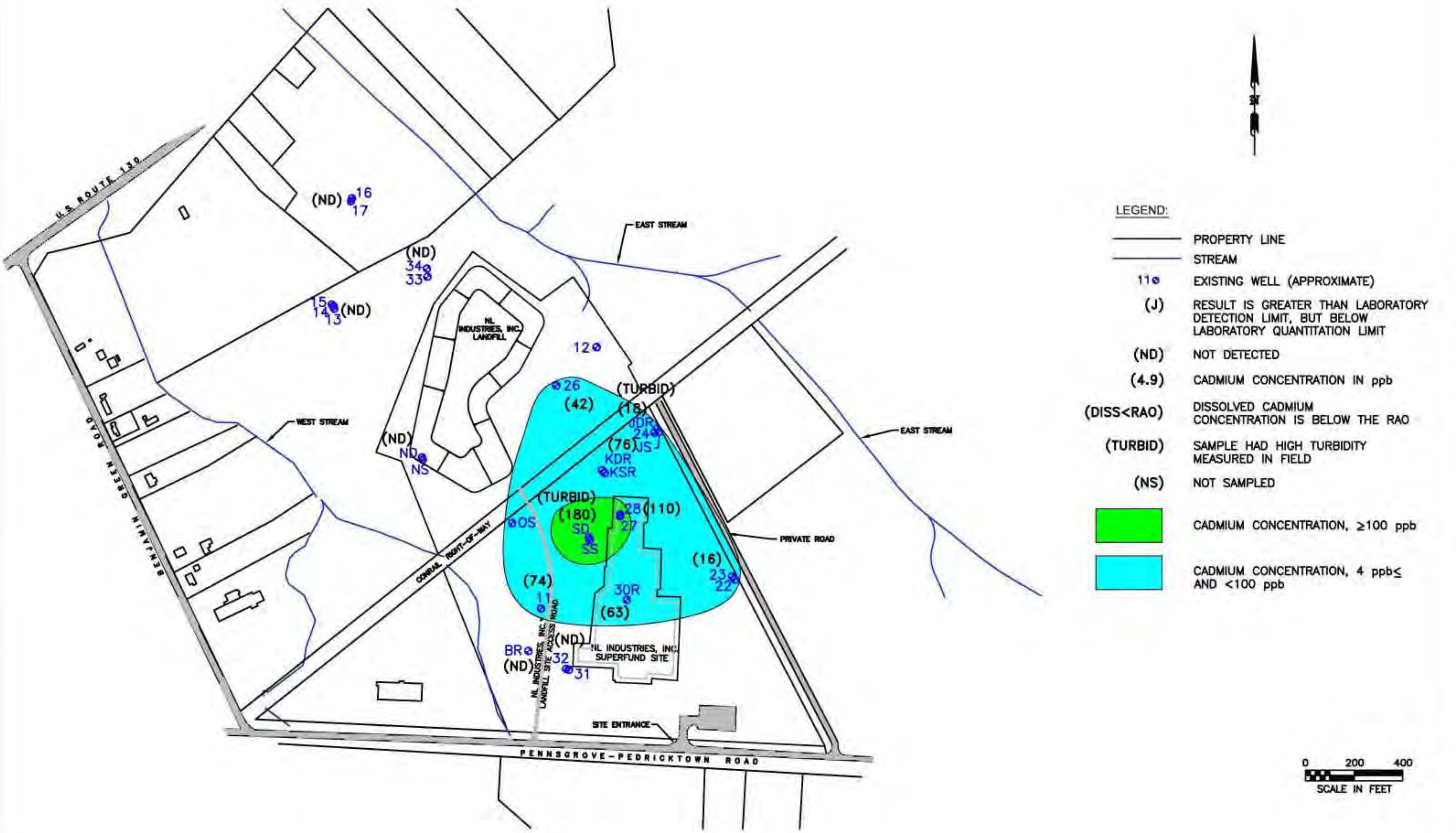
CSI Environmental, LLC 918 Chesapeake Ave. Annapolis, MD 21403 410-268-2765	Drafter: M. Hickey Approved By: J.D. Ferris Prepared: 2/2/2011	Total Pb Distribution - Deep Zone November 2010 NL Industries, Inc. Superfund Site Pedricktown, NJ	FIGURE 6

500447



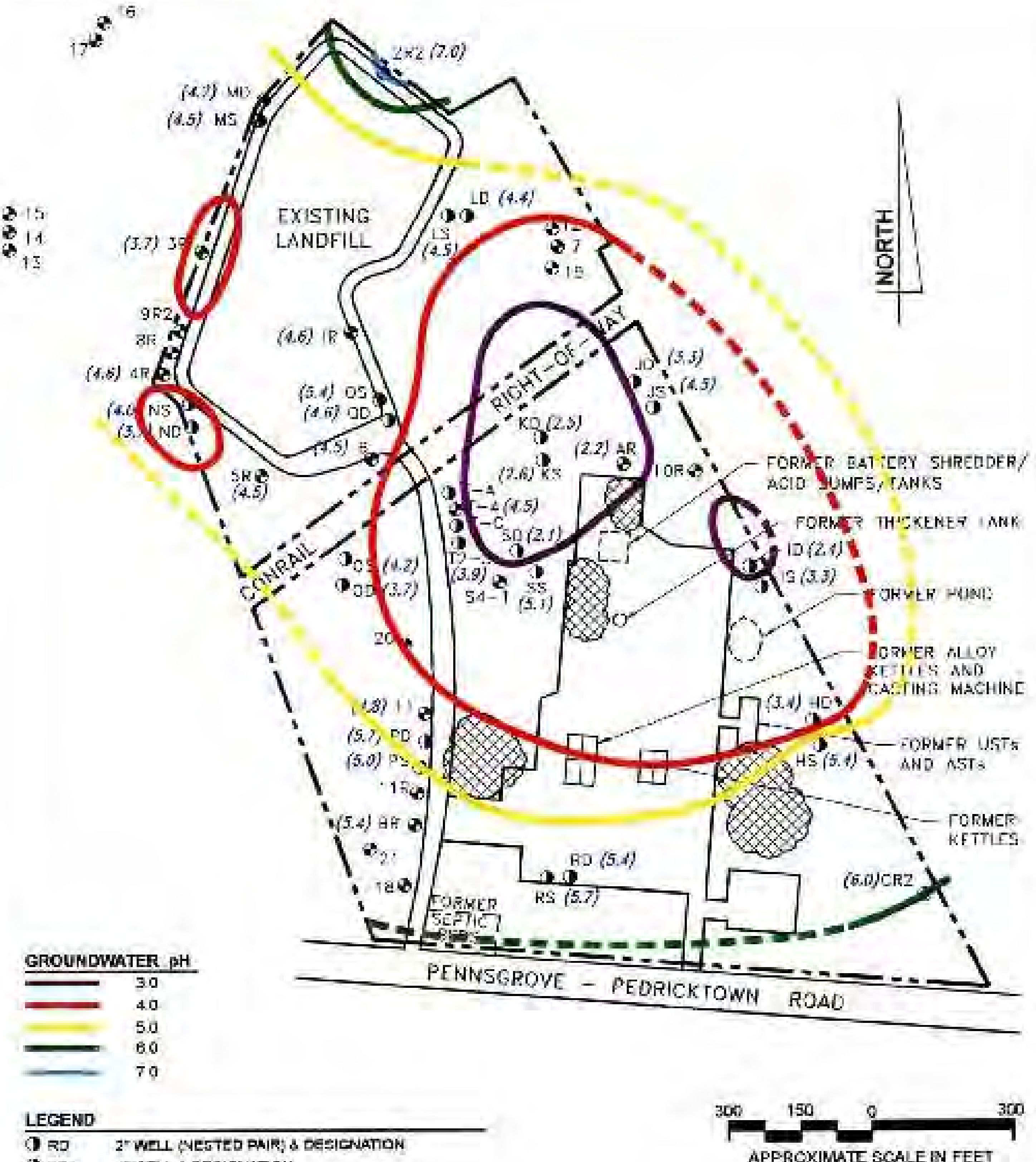
CSI Environmental, LLC 918 Chesapeake Ave. Annapolis, MD 21403 410-268-2765	Drafter: M. Hickey Approved By: J.D. Ferris Prepared: 2/2/2011	Total Cd Distribution - Shallow Zone November 2010 NL Industries, Inc. Superfund Site Pedricktown, NJ	FIGURE 7

500448



CSI Environmental, LLC 918 Chesapeake Ave. Annapolis, MD 21403 410-268-2765	Drafter: M. Hickey Approved By: J.D. Ferris Prepared: 2/2/2011	Total Cd Distribution - Deep Zone November 2010 NL Industries, Inc. Superfund Site Pedricktown, NJ	FIGURE 8

500449



LEGEND

RD 2" WELL (NESTED PAIR) & DESIGNATION

CR2 4" WELL & DESIGNATION

(4.5) GROUNDWATER pH

FORMER SLAG PILE LOCATION

NOTE: GROUNDWATER pH CONTOURS SHOWN ARE A REPRESENTATIVE COMPOSITE OF DATA FROM SHALLOW AND DEEP WELLS IN THE UNCONFINED AQUIFER.

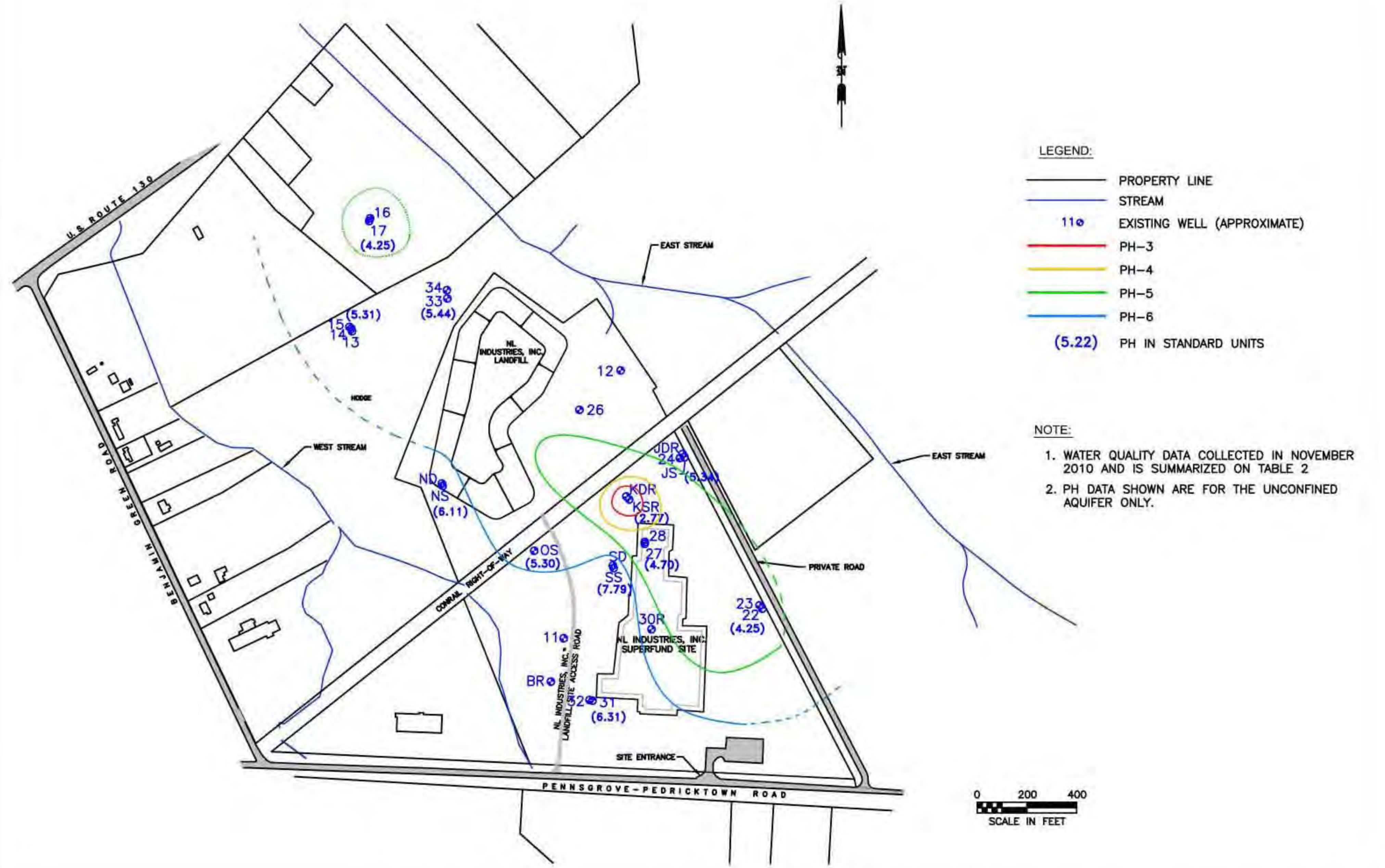
pH of Groundwater - 1983

NL Industries Site
Pedricktown, New Jersey

GEOSYNTEC CONSULTANTS
COLUMBIA, MARYLAND

Figure 9

500450



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Approved By: J.D. Ferris

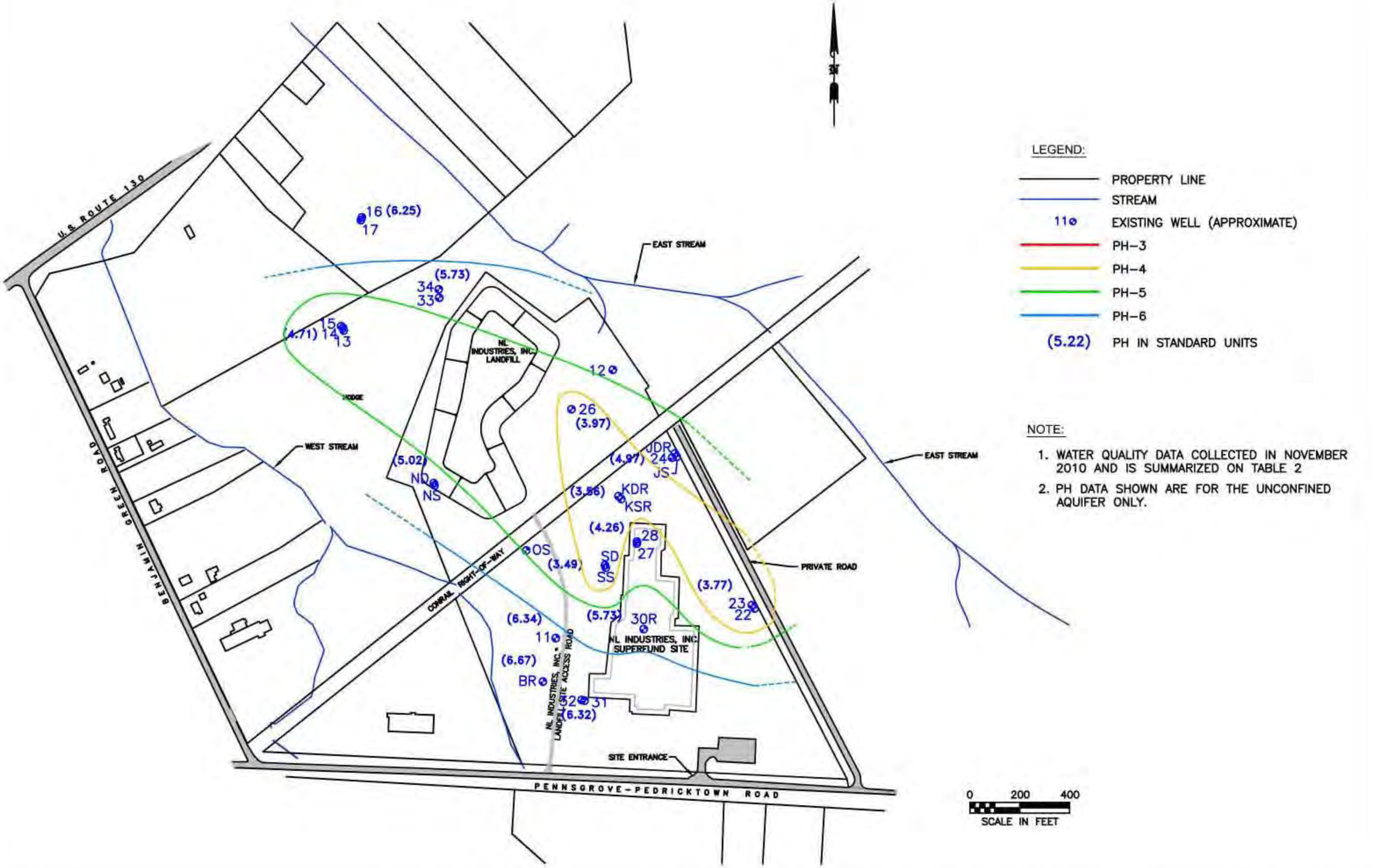
Last Revised: 12/21/2010

Groundwater pH Distribution - Shallow Zone
November 2010

NL Industries, Inc. Superfund Site
Pedricktown, NJ

500451

FIGURE 10



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Drafter: M. Hickey

Approved By: J.D. Ferris

Last Revised: 12/21/2010

Groundwater pH Distribution - Deep Zone
November 2010

NL Industries, Inc. Superfund Site
Pedricktown, NJ

500452

FIGURE 11

APPENDIX II - TABLES

Table 1 – Chemicals of Concern (COCs) for Groundwater[1]		
Chemical of Concern	Higher of the NJGWQS and the PQL[3] (ppb)	Federal MCL (ppb)
Arsenic	3	10
Beryllium	1	4
Cadmium[2]	4	5
Lead	5	15[4]
1,1-dichloroethane	50	
1,1-dichloroethylene	1	7
Tetrachloroethene	1	5
Vinyl chloride	1	2

1 – The list of COCs includes those identified in Table A of the 1994 ROD. These COCs were identified for the purpose of assessing risk at the NL Site. For any listed contaminant, the most stringent of the NJGWQS/PQL and the Federal MCL applies.
2 – Cadmium was later added as a groundwater COC.
3 – The values represent the higher of the New Jersey Groundwater Quality Standards (NJGWQS) and the Practical Quantitation Levels (PQL)
4 – Action level for lead

Table 2
Monitoring Well Construction Details
NL Industries Superfund Site
Pedricktown, New Jersey

Monitoring Well	Casing Diameter	Well Depth [1]	Top Screen [2]	Bottom Screen [2]	Top of Casing Elevation [3]	Top Screen Elevation	Bottom Screen Elevation	Depth To Water [4]	Groundwater Elevation	Aquifer Zone [5]
24	2	73	68	73	13.13	-54.87	-59.87	12.22	0.91	FCA
12	4	78.2	58.2	78.2	11.79	-46.41	-66.41	10.79	1.00	FCA
13	4	115.7	95.7	115.7	11.59	-84.11	-104.11	11.62	-0.03	SCA
16	4	56.8	36.8	56.8	10.79	-26.01	-46.01	7.50	3.29	UA - Deep
11	4	54.1	34.1	54.1	9.72	-24.38	-44.38	4.68	5.04	UA - Deep
BR	4	39	33	39	9.74	-23.26	-29.26	5.60	4.14	UA - Deep
14	4	46.6	26.6	46.6	11.39	-15.21	-35.21	6.64	4.75	UA - Deep
23	2	24	24	34	14	-10	-20	8.54	5.46	UA - Deep
28	2	30	20	30	13.98	-6.02	-16.02	8.37	5.61	UA - Deep
32	2	30	20	30	14.22	-5.78	-15.78	8.82	5.40	UA - Deep
SD	2	29.4	17.4	29.4	12.33	-5.07	-17.07	6.90	5.43	UA - Deep
KDR	2	24	14	24	9.47	-4.53	-14.53	3.85	5.62	UA - Deep
30R	2	28.71	17	27	12.81	-4.19	-14.19	7.32	5.49	UA - Deep
JDR	2	27.26	17	27	13.01	-3.99	-13.99	7.37	5.64	UA - Deep
34	2	20	10	20	6.55	-3.45	-13.45	3.23	3.32	UA - Deep
ND	2	24	14	24	11.22	-2.78	-12.78	7.10	4.12	UA - Deep
26	2	22	12	22	11.86	-0.14	-10.14	6.53	5.33	UA - Deep
17	4	23	8.0	23	9.31	1.31	-13.69	4.60	4.71	UA - Shallow
15	4	25	10.0	25	11.32	1.32	-13.68	6.51	4.81	UA -Shallow
33	2	10	5	10	6.67	1.67	-3.33	3.39	3.28	UA -Shallow
22	2	16	11	16	14.16	3.16	-1.84	8.75	5.41	UA -Shallow
KSR	2	15	5	15	9.53	4.53	-5.47	3.96	5.57	UA -Shallow
SS	2	16.4	6.4	16.4	11.64	5.24	-4.76	6.17	5.47	UA -Shallow
OS	2	21.3	6.3	21.3	11.82	5.52	-9.48	6.77	5.05	UA -Shallow
NS	2	16.5	6.5	16.5	12.17	5.67	-4.33	7.91	4.26	UA -Shallow
JS	2	15.37	5	15	12.95	7.95	-2.05	7.31	5.64	UA -Shallow
27	2	15	5	15	13.49	8.49	-1.51	7.86	5.63	UA -Shallow
31	2	15	5	15	14.27	9.27	-0.73	6.56	7.71	UA - Shallow

Notes:

(1) Depth to bottom of well in feet below top of casing (TOC).

(2) Screened interval of well in feet below ground surface.

(3) TOC elevation in feet above mean sea level.

(4) Depth to water in feet below TOC, measured in November 2010.

(5) UA = Unconfined Aquifer , FCA = First Confined Aquifer, SCA = Second Confined Aquifer.

APPENDIX III – RESPONSIVENESS SUMMARY

APPENDIX III

RESPONSIVENESS SUMMARY

NL Industries, Inc. Superfund Site

INTRODUCTION

As required by Superfund policy, this Responsiveness Summary provides a summary of the citizens' comments and concerns regarding the Proposed Plan for the NL Industries, Inc. (NL) Superfund Site (Site), and the U.S. Environmental Protection Agency's (EPA's) responses to those comments and concerns. At the time of the public comment period, EPA presented a proposed change to the groundwater remedy selected in the July 8, 1994 Record of Decision (ROD) for the NL Site, which is located in Pedricktown, Salem County, New Jersey. The groundwater remedy is the only component of Operable Unit 1 (OU1) which will be modified. All comments summarized in this document have been considered in EPA's final decision for selection of a remedial alternative for the OU1 groundwater remedy.

This Responsiveness Summary is divided into the following sections:

I. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS: This section provides the history of community involvement and concerns regarding the NL Site.

II. COMPREHENSIVE SUMMARY OF MAJOR QUESTIONS, COMMENTS, CONCERNS AND RESPONSES: This section includes summaries of oral comments received by EPA at the July 7, 2011 public meeting, EPA's responses to these comments, as well as responses to written comments received during the public comment period.

The Responsiveness Summary includes attachments which document public participation in the remedy selection process for the CLTL Site. The attachments are as follows:

- Attachment A – July 2011 Proposed Plan for the NL Site;
- Attachment B – Public Notice published in Today's Sunbeam;
- Attachment C – July 7, 2011 Public Meeting Attendance Sheet; and
- Attachment D – Transcript of the July 7, 2011 Public Meeting.

I. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

EPA's Proposed Plan for the OU1 groundwater remedial action was released to the public on June 22, 2011. A copy of the Proposed Plan, Focused Feasibility Study for Groundwater Remediation (FFS) and other documents which comprise the administrative record file were made available to the public in the information repository located at the Penns Grove Public Library as well as the EPA Region 2's Record Center. A public notice was published in Today's Sunbeam, a Salem County newspaper, on June 22, 2011, advising the public of the availability of the Proposed Plan. This notice also announced the opening of a 30-day public comment period, from June 22, 2011 to July 21, 2011, and invited the interested parties to attend an upcoming public meeting. This public meeting, during which EPA presented the preferred alternative for the OU1 groundwater remedy, answered questions regarding the NL Site, and accepted verbal comments regarding the Proposed Plan, was held on July 7, 2011 at the Oldmans Township School located at 10 Freed Road, Pedricktown, New Jersey.

II. COMPREHENSIVE SUMMARY OF MAJOR QUESTIONS, COMMENTS, CONCERNS AND RESPONSES

Part 1: Verbal Comments

Comment #1: A citizen was concerned that the landfill, located adjacent to the former facility area of the NL Site, is acting as a source to groundwater contamination.

EPA Response: The landfill was closed under New Jersey State authority prior to the listing of the NL Industries Inc. Superfund Site on the National Priorities List. The landfill is not part of the Superfund Site. The landfill was capped and has a leachate collection system which means that any contaminants that may leach from the soil beneath the landfill cap do not reach the groundwater. The leachate from the landfill is periodically collected, when the leachate collection tank nears its holding capacity, and is properly disposed of off-site. The landfill and its leachate collection system are maintained by NL Industries and are monitored by the New Jersey Department of Environmental Protection. Based on groundwater monitoring data, EPA does not believe that the landfill is acting as a source to groundwater contamination. There are currently 28 groundwater monitoring wells on the NL Site. Groundwater monitoring has been conducted periodically since the 1980's. While lead and cadmium remain at levels above the New Jersey Groundwater Quality Standards, there has been a trend of decreasing contaminant concentrations over time. If the landfill continued to act as a source to groundwater contamination, the contaminant concentrations would not decrease over time.

Comment #2: A citizen was concerned that contaminated soil was not excavated.

EPA Response: A Remedial Investigation (RI) was conducted for the NL Site to determine the nature and extent of contamination. Areas identified as having greater than

500 parts per million (ppm) of lead in the soil or sediment were required to be excavated. The excavation of these contaminated soils and sediment was conducted in phases, known as Operable Units (OUs). Soil and sediment containing greater than 500 ppm of lead were removed from the former facility area, portions of the East Stream and West Stream and portions of the U.S. Army Corps of Engineers Channel located north of Route 130. After excavation of the contaminated portions was completed, confirmatory sampling was done to ensure that further excavation was not required.

Comment #3: A citizen wanted to know how far out from the current groundwater plume was the groundwater tested and how often is the groundwater monitored.

EPA Response: Groundwater at the NL Site flows in a westerly direction toward the West Stream. Groundwater was sampled around the NL Site and sampling went as far out as necessary until a clean groundwater zone was reached. This is how the nature and extent of groundwater contamination was determined and the contaminant plume was delineated. EPA pointed out the monitoring well network, consisting of 28 monitoring wells, on a figure from the presentation to illustrate the current extent of the groundwater monitoring wells. The figure was also used to demonstrate where the current plume of groundwater contamination exists, beneath the former facility area, based on the most recent groundwater data from 2004, 2007 and 2010. All wells within the well network are sampled during groundwater monitoring events. As part of the groundwater remedy, a schedule of groundwater monitoring would be established to ensure that the plume is not migrating and to collect data on contaminant concentrations.

Comment #4: A citizen asked if the aquifer soils were going to be excavated after the reagent injection process is completed.

EPA Response: The reagent injection remedy will cause the contaminants to adsorb or bind to the aquifer soils. This process removes the contaminants from the groundwater flow and has a high degree of permanence as it would take a very low pH to reverse the reaction. The pH at the NL Site has been rising toward background levels since the source of the contamination has been removed. Accordingly, the aquifer soils do not need to be excavated in order to achieve the cleanup goals.

Comment #5: Citizens asked if reagent injection had been used successfully in other cases and had concerns of the toxicity of the reagent and how it would be injected into the groundwater.

EPA Response: Reagent Injection technology has been selected for use at other sites, such as the Puchack Well Field Superfund Site (Puchack Site). At the Puchack Site, chromium is the contaminant of concern in the groundwater. Treatability studies were done and lactate was identified as the reagent to be used. The treatability study went well and reagent injections are scheduled to begin later this year.

There are some other sites where reagent injection has been used; however, EPA did not provide a detailed list of sites at the time of the meeting. EPA did state that there have been a number of studies done on the use of reagent injection as well as the use of phosphate reagents. These studies were evaluated in the FFS. The phosphate reagent is not toxic and is not expected to cause further environmental damage. The reagent would be injected into the groundwater via injection wells. EPA reiterated that while reagent injection is a proven technology and our data regarding site-specific conditions indicate that it should work at the NL Site, a treatability study will be done at the NL Site. The treatability study will enable us to test the use of the reagent in a small area of the site to collect data and confirm that the technology will work. The treatability study will also aid in the development of the remedial design details.

Note that further detailed information regarding the use of reagent injection is provided in the Written Comments Section, Comments received from the U.S. Army Corps of Engineers (USACE), Philadelphia District regarding the Proposed Plan, Comment #3.

Comment #6: Citizens asked how long the groundwater would be monitored.

EPA Response: The reagent injection remedy will require extensive monitoring before, during and after the remedy implementation. All groundwater monitoring wells in the network will be sampled during the monitoring events and additional wells may be added and monitored as necessary. Once the groundwater cleanup goals have been achieved, groundwater will continue to be monitored for approximately 3 to 10 years, as necessary, to ensure that the remedy remains protective and EPA is satisfied with the results.

Comment #7: A citizen asked if EPA was aware of the sediment and groundwater sampling conducted by the U.S. Army Corps of Engineers.

EPA Response: EPA is aware of the sediment and groundwater sampling conducted by the U.S. Army Corps of Engineers (USACE). The USACE recently installed and sampled a number of groundwater wells in the vicinity of their drainage channel, located north of the NL Site, across from Route 130. The USACE groundwater wells in the vicinity of the NL Site (along Benjamin Green Road and Route 130) confirmed that lead and cadmium were not present at concentrations exceeding drinking water standards. The data supports EPA's observations that the groundwater contamination has not impacted the USACE channel or areas beyond Benjamin Green Road. With respect to the USACE sediment sampling, areas of the drainage channel were reported to have greater than 500 parts per million of lead in the sediment. EPA will further evaluate possible lead contamination and its sources.

Comment #8: A citizen expressed concern over the fact that a groundwater remedy was selected in the 1990's and the citizen believes that no progress has been made toward the cleanup of the groundwater contamination.

EPA Response: The 1994 ROD for OU1 selected a remedy for soil, sediment and groundwater. EPA first addressed the areas posing the most immediate public health concerns. This included the cleanup of the contaminated soil and sediment that resulted from facility operations. While the soil and sediment component of the ROD were being addressed, groundwater continued to be monitored. Remedial activities for the soil and sediment were completed relatively recently and more focus was placed on addressing the groundwater contamination. Given that groundwater continued to be monitored over the years, a significant data set of groundwater monitoring parameters was collected and analyzed. The data, collected as recently as 2010, demonstrated a significant decreasing trend in groundwater concentrations of the contaminants of concern. The groundwater remedy selected in the 1994 OU1 ROD called for the extraction and treatment of groundwater which would involve the construction of a treatment plant and was estimated to require approximately 50 years to achieve the groundwater cleanup goals. Given the decreasing trend in contaminant concentrations, alternative groundwater treatment options were explored because there are now other treatment technologies available, such as reagent injection, which can more efficiently treat the amount of groundwater contamination that is currently present at the NL Site. Reagent Injection was determined to be just as effective as the pump and treat technology and it would take significantly less time and money to implement this remedy.

Comment # 9: Citizens wanted to know who is paying for the remedy and who is conducting the work.

EPA Response: The NL Site activities have been funded and performed by a group of Potentially Responsible Parties (PRPs), with EPA oversight to date. EPA expects to enter into a legal agreement with the PRPs to implement the groundwater remedy which is the subject of this ROD Amendment. If the PRPs accept the terms of the legal agreement, they will continue to fund and perform the next phase of work at the NL Site and EPA would continue to review the documents and plans prepared by the PRPs and oversee the field activities. The New Jersey Department of Environmental Protection would also participate in the review process. No work would be conducted by the PRPs without approval by EPA.

Comment #10: A citizen questioned whether or not there have been any studies in the area surrounding the NL Site with respect to mortality rates.

EPA Response: EPA is unaware of any health studies conducted specifically in the area around the NL Site. Studies regarding health effects and mortality rates are usually conducted by the state health department or the Agency for Toxic Substances and Disease Registry. EPA conducted a human health risk assessment whereby current and potential future risks from Site contaminants were evaluated. The risk assessment determined that there was a potential future risk due to ingestion of contaminated groundwater. This potential future risk is the reason why remedial actions to restore the groundwater to drinking water standards is required. Currently, groundwater use at the Site is restricted so that no one is currently being exposed to contaminated groundwater.

Comment #11: A citizen asked how there could be groundwater contamination if the remedial actions for the soil and sediment were completed successfully.

EPA Response: During the years in which the NL Industries facility was in operation, slag piles containing lead and other contaminants were dumped and stored on site. Battery crushing operations also released acids into the soil which mobilized contaminants and allowed them to migrate through the soil into the groundwater. Therefore, even though the contaminated soils and sediments, which served as the source of contamination, were removed through previous Superfund remedial actions, contaminants had already migrated into the groundwater. Accordingly, additional remedial actions to address the contaminated groundwater need to be taken.

Comment #12: Citizens asked if the groundwater wells are screened at different levels and at what level was the contamination found.

EPA Response: The groundwater contamination is limited to the unconfined aquifer. Groundwater samples were collected throughout the unconfined aquifer and monitoring well screen depths ranged from 5 feet below ground surface to 50 feet below ground surface.

Comment #13: A citizen asked about the depth at which the soil samples were taken.

EPA Response: The water table at the NL Site is approximately 5 feet below the ground surface. The soil cleanup goal was to remove all soils having greater than 500 ppm of lead. Therefore, soil testing only went as deep as necessary until either clean soil was detected or the water table was reached. Contaminated unsaturated soils having greater than 500 ppm of lead were excavated. Contamination detected below the water table in the unconfined aquifer is the subject of this ROD Amendment.

Comment #14: A citizen was concerned about the pH adjustment portion of the reagent injection remedy. In particular, the citizen asked about the timeframe needed for the pH to rise and the effects on the groundwater if the pH was raised too high.

EPA Response: The implementation of the reagent injection remedy requires that a treatability study be conducted in a small area on-site. The treatability study will help to determine the amount of base needed to adjust the pH to the desired level as well as the number of injection points needed to distribute the base and reagent. The data along with groundwater monitoring will allow us to control the pH to ensure that it is not raised too high. The treatability study may take some time. After analyzing the data from the treatability study, an engineering design will be developed to be applied to the entire Site to fully implement the groundwater remedy.

Comment #15: A citizen, who lives in the vicinity of the NL Site, mentioned that she had to drill a new well on her property and expressed concern over the quality of the groundwater that would come from the new well.

EPA Response: The citizen's property is located a few blocks northeast of the NL Site near the intersection of Route 130 and Railroad Avenue. Site-related contamination has not migrated to the east. NL Site groundwater monitoring has demonstrated that site-related contamination is primarily located below the former NL facility area. Furthermore, groundwater flow at the NL Site is in a westerly direction toward the West Stream and residential groundwater wells sampled along Route 130, north of the NL Site, have not had exceedances of the New Jersey Groundwater Quality Standards for lead and cadmium, which are the primary contaminants of concern at the site. Therefore, it is highly unlikely that the citizen's groundwater well would be affected by site-related contamination.

Comment #16: Citizens asked how long it would take to implement the groundwater remedy.

EPA Response: It is anticipated that the remedy will be selected approximately in September 2011. After the remedy selection, EPA will work with the Responsible Parties to develop a design or plan for the treatability study. It is likely to take a couple of years to complete the treatability study and another year or so to finalize the subsequent engineering design for the remedy due to the inherent complexities associated with implementing a groundwater remedy. Once the remedial design is finalized and the remedy implemented, it is estimated to take approximately 10 years to reach the groundwater cleanup goals.

Comment #17: Citizens wanted to know how long it would take before the land could be redeveloped and used for purposes other than Superfund cleanup activities and who would make the decision regarding what the land could be used for. There were also concerns regarding ownership of the property and liability issues.

EPA Response: EPA supports appropriate reuse of Superfund Sites as long as they are compatible with the remedy. Since we are not going to be installing a pump and treat plant, there would definitely be an opportunity to reuse the former facility area of the Site prior to achievement of cleanup goals. There are currently groundwater monitoring wells located on-site and additional wells or injection points may need to be installed; however, as long as EPA can maintain access to the wells, there should be no reason why a land reuse plan could not be considered. The main issue with reuse at the NL Site is that someone needs to take ownership of the Site. As EPA understands it, the Site is currently abandoned. Town attorneys can meet with EPA attorneys to discuss potential liability issues in taking ownership to the Superfund Site; however, liability issues can usually be worked out. After the issue of ownership is settled, the Town or whomever owns the property can present a detailed plan for the reuse of the NL Site to EPA. EPA does not decide what the land will be used for; however, EPA needs to be involved in the planning stages to ensure that the reuse plan does not interfere with the on-going remedy.

Comment #18: A citizen was concerned about the frequency of sediment sampling on his property. He wanted to know if extensive sampling was going to be done every year.

EPA Response: The citizen was referring to sediment remediation work that is currently taking place in the West Stream. Large scale sediment sampling will not be taking place on a regular basis. The recent sampling was a result of sediment monitoring that showed some areas of sediment containing greater than 500 ppm of lead. In order to determine the extent of the lead contamination, a large scale sampling effort along the West Stream was conducted. EPA has identified the extent of areas containing lead above 500 ppm in the sediment and these areas will be excavated during the summer of 2011. After the excavation is complete, confirmatory samples will be taken to ensure that the job has been satisfactorily completed. Once completed, only occasional monitoring will be conducted, which is not likely to be on a large scale.

Part 2: Written Comments

Comments received from the U.S. Army Corps of Engineers (USACE), Philadelphia District regarding the Proposed Plan

Comment #1: Even though this document [Proposed Plan] does not discuss the sediment contamination, it should be noted that recent sampling conducted by USACE Philadelphia District personnel, as well as by our contractor, has shown the presence of sediment contamination in and around the West Stream between Route 130 and the Delaware River (i.e. on USACE property). Both XRF and laboratory chemical tests have shown sediment samples which contain greater than 500 mg/kg of lead.

EPA Response: EPA has received the sampling report from the USACE containing the sediment results and is reviewing the report. EPA expects to discuss the report with the USACE upon completion of our review. Note that the sediment contamination is not the subject of this ROD Amendment. The ROD Amendment relates to the groundwater remedy.

Comment #2: The text states that the goal is to restore the aquifer to its most beneficial use. Does this mean that the goal is to restore the aquifer back to drinking water quality, since this is a Class II aquifer?

EPA Response: Yes. The goal is to restore the aquifer to drinking water quality as it is the most beneficial use.

Comment #3: Are there successful case histories of the use of the proposed Alternative 3 component (Reagent Injection) in applications similar to NL Industries and using the same treatment reagents?

EPA Response: Reagent injection is a general term used to describe a technology whereby a substance is injected into the subsurface or groundwater to treat a specific contaminant or class of contaminants. For the NL Site, the contaminants targeted through reagent injection include lead and cadmium in the unconfined aquifer. A preliminary bench scale treatability study indicated that a phosphate reagent would be successful in removing lead and cadmium from the groundwater. Note that phosphate additives are generally safe and are often food quality grade or certified to the American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) Standard #60 Dinking water Treatment Chemicals as approved for use in potable drinking water.

Therefore, the use of phosphates to treat contaminated groundwater at the NL Site is not anticipated to result in any adverse effects on the groundwater chemistry or the future use of the groundwater as a drinking water source.

Reagent injection is being used at the Puchack Well Field Superfund Site to address chromium contaminated groundwater. At this site, a pilot study was completed to confirm the success of the selected reagent. The pilot study demonstrated that the reagent worked better than expected in treating the chromium contamination. A pilot study will also be conducted at the NL Site prior to full scale remedy implementation to ensure that the phosphate reagent works as anticipated.

The Nevada Stewart Mine Site is an example where a phosphate reagent was applied to a permeable treatment wall to treat groundwater containing elevated levels of lead and cadmium, among other metals. The phosphate reagent was successful at removing the metals from the contaminated water.

Phosphates have also been successfully used in industrial applications to treat metals contamination in water systems and several research studies have also been conducted and have confirmed the ability of phosphates to immobilize and remove lead and cadmium from groundwater flow.

References of sites and studies discussed above are provided below:

- Puchack Well Field Superfund Site
  http://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0204096
- Nevada Stewart Mine Site
  http://www.epa.gov/nrmrl/pubs/600r06153/600r06153.pdf
- Ma QY, Traina SJ, Logan TJ (1993), *In Situ Lead Immobilization by Apatite*. *Environ. Science and Technology*, 27, 1803-1810.
- Dr. Silvano Mignardi (2010). Removal of Toxic Metals from Water and Soil by Phosphate Treatment.
- Wright, Judith (PIMS NW Inc.) and Conca, James (Los Alomos National Laboratory), *Remediation of Groundwater Contaminated with Zn, Pb and Cd using a Permeable Reactive Barrier with Apatite II*, November 2002.

Comment #4: Is there any expectation that the phosphate reagent may be at least partially used up because of demand by other metals that are present in much greater concentration compared to Pb and Cd? For example iron, aluminum, etc? Also is any demand expected from biological growth such as bacteria that may use up the phosphate in the subsurface or in potentially aerated locations such as injection points, wells, etc?

EPA Response: The demand for phosphate by other metals was considered and discussed in the Focused Feasibility Study for Groundwater Contamination (FFS). Generally speaking, precipitation reactions, such as those induced through certain injection reagents including phosphates, tend to react with elements and compounds following a kinetic order of reaction. The order of reaction varies from compound to compound and with the geochemical conditions in which the reagent is applied (e.g., pH and reagent concentration). For example, when phosphate is injected into groundwater it tends to react with dissolved lead before dissolved cadmium (based upon their individual solubility products). Concentration can have an effect on the order of reaction, but not at the relatively low concentrations of lead and cadmium detected at the Site. Solubility products (Ksp) are often useful for predicting reaction sequences among compounds. Smaller solubility products indicate a less soluble compound and one likely to form before a more soluble compound under given conditions. The following Ksp values illustrate that lead phosphate is more likely to form first among the compounds listed because it has the lower solubility product.

Aluminum phosphate	Ksp = 6.3 X 10-19
Calcium phosphate	Ksp = 1.0 x 10-29
Cadmium phosphate	Ksp = 1.0 x 10-31
Lead phosphate	Ksp = 1.0 X 10-42

These Ksp values indicate that lead phosphate is significantly less soluble than cadmium phosphate, calcium phosphate, or aluminum phosphate. Cadmium is included due its presence at elevated concentrations at the Site. Aluminum and calcium are included because they are typically found in groundwater and will have a tendency to consume some of the reagent injected into the subsurface. It is expected that lead and cadmium will react with the phosphates first followed by calcium and aluminum.

The low Ksp values also indicate that phosphate would be a good candidate for immobilizing lead and cadmium with minimal consumption from non-target compounds like calcium and aluminum. To determine the appropriate amount of phosphate needed to overcome its consumption by non-target compounds, a reagent demand test will be incorporated into the pilot test. This test is used to assess the impact of phosphate consumption from non-target compounds and help determine an appropriate concentration of the reagent. The demand test incorporated into the pilot study should also be able to provide information regarding demand by biological growth as the test will be conducted in a small area on-site. Therefore, whatever is present in the groundwater at the NL Site, whether it be other metals or biological growth, we should be able to gather site-specific data regarding the amount of reagent needed to effectively achieve the cleanup goals.

Comment #5: Will the pilot study ensure that there is good distribution and monitoring of the reagents that are added to the subsurface to ensure consistent treatment? If so, how would this be accomplished?

EPA Response: The details regarding reagent distribution will be determine by analyzing data obtained from the pilot study as well as the remedial design.

Comment #6: Will the pilot study include a comparison of the reagent-treated area with an untreated control area to generate the performance data?

EPA Response: The work plan for the pilot study will be developed once the ROD Amendment is issued. During the pilot study, groundwater will continue to be monitored at the NL Site for all wells currently in the well network. Therefore, pilot study data will be able to be compared to data collected from areas not included in the pilot study.

Comment #7: Will there be consideration of any impacts of using the in situ phosphate treatment at down-gradient or untreated locations? USACE property is down gradient from the NL site.

EPA Response: As stated in the response to Comment #4, the pilot study will be used to calculate the amount of phosphate reagent needed to achieve the cleanup goals and to limit the potential amount of unreacted reagent. Groundwater will be monitored to collect data on the contaminant levels as well as the reagent concentrations and general groundwater parameters. The phosphate reagent is not anticipated to have negative impacts in the unconfined aquifer.

Comment #8: Will the pilot study determine whether any rebound in soluble Pb, Cd, or other metal concentration may occur after the high pH slug is applied and the groundwater pH stabilizes over time?

EPA Response: The reagent injection remedy will require extensive monitoring before, during and after the remedy implementation. All groundwater monitoring wells in the network will be sampled during the monitoring events and additional wells may be added and monitored as necessary. Once the groundwater cleanup goals have been achieved, groundwater will continue to be monitored for approximately 3 to 10 years, as necessary, to ensure that the remedy remains protective and EPA is satisfied with the results.

Comments received from the Pedricktown Site Group (Group) regarding the Proposed Plan

Comment #1: Reagent Injection - The Group agrees with USEPA that a change to the groundwater remedy selected in the July 1994 Record of Decision is appropriate. For the reasons addressed in the Focused Feasibility Study for Groundwater Remediation (FFS Report) and other documents previously submitted by the Group to USEPA, the Group believes that the USEPA's selection of the reagent injection remedy is appropriate.

EPA Response: EPA acknowledges the Group's comment.

Comment #2: In the July 2011 Proposed Plan, USEPA indicates that: (a) the baseline risk assessment performed in 1990 is still valid; (b) the potential exposure pathways, land use scenarios, and receptors identified in the baseline risk assessment remain applicable at the site; and (c) an unacceptable human health risk remains due to the potential for ingestion of contaminated groundwater at the site. The baseline risk assessment was performed in 1990 as part of the remedial investigation and was based on the concentrations of the contaminants of concern detected in groundwater samples collected at the site in 1989.

The 1990 baseline risk assessment evaluated the potential risks to human health by identifying potential exposure pathways by which the public could be exposed to contaminated groundwater. Potential exposures were assessed for both potential present and future land use scenarios. Current land use in 1990 was considered in the risk assessment to be an industrial facility, and future land use was characterized as either an industrial facility or a residential area. In 1990, current potential receptors included off-site residents (child and adult) and off-site workers. Future potential receptors in 1990 included on-site residents (child and adult), off-site residents (child and adult), on-site workers, and off-site workers. The baseline risk assessment concluded in 1990 that there was the potential for unacceptable risk due to the potential for future ingestion of contaminated groundwater.

The Group believes it is important to note that despite the conclusion in the 1990 risk assessment regarding potential groundwater contamination exposure: (a) there have been no known incidents of human ingestion of contaminated groundwater from the site during the 21 years since the baseline risk assessment was performed; (b) over the years, as a result of removal of contaminated soil and other source materials and through natural attenuation mechanisms, the area of impacted groundwater containing lead and cadmium concentrations above the New Jersey Groundwater Quality Standards (NJGWQSs) has decreased and is now limited to the area shown on Figure 1 of USEPA's Proposed Plan; (c) there is no current, allowed use of on-site groundwater at the site; (d) considering the industrial zoning of the site, there is an extremely low possibility that the site will be used for residential purposes and that on-site groundwater will be used for potable water by residential occupants in the future; (e) considering the industrial zoning of the site and the presence at the site of now inactive piping connections to the municipal water supply, there is an extremely low likelihood that groundwater at the site will be consumed by workers at the industrial site in the future; (f) there is no known off-site migration of contaminated groundwater containing lead and cadmium concentrations above the NJGWQSs to off-site receptors; and (g) even if off-site groundwater contamination occurred, which is unlikely due to the natural attenuation trends that have already been demonstrated, the residents living along Benjamin Green Road are serviced by the municipal water supply, and a groundwater flow divide (referenced in the FFS Report but not referenced in USEPA's Proposed Plan) acts as a hydrogeological barrier to groundwater flow between the site and the business and residences along US Route 130. As a result of the site conditions described above, the Group believes that the 1990 risk assessment significantly overstates the potential current and future risks of exposure to groundwater contamination because the risks of exposure are now significantly lower than they were at the time the risk assessment was performed in 1990.

EPA Response: The unconfined aquifer at the site is classified as a Class II aquifer in the state of New Jersey. The designated use of a Class II aquifer is to provide potable water and this is considered to be the most beneficial use for the aquifer. Accordingly, while the groundwater at the site is not currently being used for drinking water, the goal is to restore the aquifer to its most beneficial use.

A review of the most recent groundwater data reveals that the concentrations of COCs, primarily cadmium and lead, continue to exceed their respective NJDEP Groundwater Quality Criteria and Federal Maximum Contaminant Levels. These standards were promulgated to ensure that public water systems used as potable water sources remain protective of human health by limiting levels of contaminants in the drinking water. The RAO for the Site is to restore the site-related contaminated portions of the unconfined aquifer to drinking water standards for all contaminants; this RAO has not been met for all of the constituents. Therefore, unacceptable human health risk to a potentially exposed population from direct exposure to groundwater remains. The level of "perceived" risk as described by the PRP Group's comment above does not change the fact that a human health risk remains as long as there are exceedances of the drinking water standards. Furthermore, it is important to note that assessments of risk are evaluated in the absence of institutional controls. EPA does not rely on assumptions that water will not be ingested or used in the future as zoning and future site access are not controlled by EPA. The reason why there have been no incidents of ingestion of contaminated groundwater on-site is because use of groundwater at the NL Site is currently not permitted based on the known contamination. A formal Classification Exemption Area will be implemented as part of the remedy to ensure that groundwater use is restricted until cleanup goals are achieved.

Comment #3: USEPA's Proposed Plan indicates that the groundwater contaminants detected in the unconfined aquifer at the site are comprised primarily of lead and cadmium, and volatile organic compounds (VOCs), arsenic, and radiological parameters have also been detected in localized areas at the site. In addition, the Proposed Plan indicates that total VOC concentrations have generally decreased over time via natural attenuation processes, radiological parameters were determined to be naturally occurring and not related to the site, and arsenic was later determined to be related to leachate from the closed landfill at the site. USEPA also noted that subsequent improvements were made to the landfill by NL Industries, thereby eliminating the seeps and the arsenic detections. As part of the Group's investigation of the West Stream at the site as requested by USEPA, the Group has documented the presence of other contaminants at the site that may be attributable to landfill leachate. As USEPA is aware, NL Industries is responsible for operating and maintaining the closed landfill at the site pursuant to an agreement with the New Jersey Department of Environmental Protection (NJDEP), and the Group is not responsible for addressing issues associated with maintenance of the landfill. The Group is aware that NL Industries has submitted a plan to NJDEP to upgrade the cap of the closed landfill (to eliminate an area of settlement where surface water is currently ponding), which is expected to minimize the volume of landfill leachate that is recovered by NL Industries from the closed landfill.

EPA Response: EPA is aware that NL Industries is responsible for the maintenance of the landfill cap and leachate collection system. While recent sediment and shallow groundwater samples have been taken around the perimeter of the landfill, it has yet to be concluded that contaminants are specifically coming from the landfill. Furthermore, if the landfill was acting as a source to the groundwater contamination in the unconfined aquifer, the decreasing trend in COCs that has been observed would not likely be occurring. If a determination is made that the landfill is contributing to contamination at the Site, the appropriate parties will be called upon to coordinate efforts to correct the problem.

Comment #4: USEPA's Proposed Plan indicates that: (a) the groundwater data collected at the site in 2010 showed that vinyl chloride and tetrachloroethene are the only site-related VOCs detected above the performance standards; (b) the total VOC concentrations have generally decreased over time via natural attenuation processes; and (c) the vinyl chloride and tetrachloroethene concentrations are expected to continue to decrease.

USEPA's Proposed Plan suggests that the remaining VOCs in groundwater are site related. However, in the four monitoring wells where VOCs were detected during the most recent groundwater monitoring event (2010) at the site, the VOCs were detected at concentrations below applicable health-based standards and criteria, with the exception of vinyl chloride. Vinyl chloride was detected in December 2010 at low concentrations of 7.7 µg/l and 6.9 µg/l in the groundwater samples collected from monitoring wells MW-12 and MW-24, respectively, which slightly exceeded the NJGWQS. Monitoring wells MW-12 and MW-24 are screened in the first confined aquifer and are located hydraulically upgradient from impacted areas at the site. As indicated in the FFS Report, the Group believes that the vinyl chloride detected in these wells is from an off-site source(s) based on the groundwater flow direction, the presence of potential nearby sources, and the lack of a detection of related compounds in shallow monitoring wells in areas on the site that could affect the first unconfined aquifer in the vicinity of MW-12 and MW-24.

EPA Response: EPA does not believe that there is sufficient evidence to conclusively state that the VOCs detected on-site are not site-related. Vinyl Chloride and tetrachloroethene are COCs that were identified in the 1994 ROD. Their concentrations are exceeding the groundwater cleanup goals and as the PRP Group is aware, the VOC concentrations are expected to meet the cleanup goals through natural attenuation processes within the timeframe necessary to implement the reagent injection remedy. Accordingly, VOCs are required to be monitored as part of the groundwater remedy along with the other COCs until the groundwater cleanup goals are achieved.

Comment #5: In the Proposed Plan, USEPA indicates that it plans to retain the current groundwater pump and treat remedy as the contingency remedy for the site. However, USEPA has acknowledged in the Proposed Plan that the pump and treat remedy would be the most difficult and costly of the proposed potential remedies to implement. Furthermore, the data previously collected by the Group during an aquifer pump test at the site strongly suggest that a groundwater pump and treat remedy would be incapable of achieving the remedial action objectives. The analysis of data from the Group's aquifer pump test showed that, although the extraction well was installed in the area at the site containing the highest concentrations of lead and cadmium, lead and cadmium were not prevalent in the extracted groundwater. Specifically, the concentrations of lead and cadmium in the extracted groundwater were either below the laboratory limits of detection or, when they were detected, declined rapidly during pumping, thereby indicating that: (a) removal of significant mass of lead and cadmium from the aquifer is impossible; and (b) implementation of a pump and treat remedy at the site is impractical. The pump and treat remedy, as acknowledged by USEPA in the Proposed Plan, would also require an NPDES permit for the off-site discharge of treated groundwater. If a pump and treat remedy is required, the discharge limits have not been defined and there is no assurance that the pump and treat system (defined by USEPA as precipitation, clarification, and filtration) would be able to meet the discharge requirements.

For these reasons, the Group believes it is not appropriate for USEPA to select pump and treat as the contingency remedy. In the event USEPA believes it is required to select a contingency remedy, the Group believes that the contingency remedy should be selected at a later date after data from the reagent injection remedy are available. In the event USEPA believes it is required to select and define a specific contingency remedy at the present time, the Group believes it would be appropriate to select monitored natural attenuation as the contingency remedy. For the reasons addressed in the FFS Report and as indicated by USEPA in the Proposed Plan, groundwater has already improved over time and will continue to improve over time as a result of the natural attenuation mechanisms already known to be occurring at the site.

EPA Response: EPA agrees that the reagent injection plus institutional controls remedy is anticipated to be successful in achieving the groundwater cleanup goals and will greatly enhance the natural attenuation processes already occurring at the NL Site. Should the pilot study or subsequent groundwater monitoring demonstrate that contaminant concentrations are not continuing to decrease as expected, the previously selected pump and treat remedy will be re-evaluated. EPA believes that the pump and treat remedy can achieve the cleanup goals and could meet discharge requirements; however, it is not expected to be as efficient as the reagent injection.

Comment #6: As indicated above, the Group believes that USEPA's proposed selection of the reagent injection remedy is appropriate. In the Proposed Plan, USEPA indicates that the reagent injection remedy would include continued monitoring of all contaminants of concern initially listed in the July 1994 Record of Decision. Although the Group believes that it is important to perform groundwater monitoring to confirm the effectiveness of the reagent injection remedy, the Group believes it is not necessary to resume monitoring for parameters that are not site related, for parameters that have already been shown to meet the performance standards, and for parameters that have not been detected during recent groundwater monitoring activities.

EPA Response: Continued monitoring of all COCs, and additional parameters as deemed necessary, is required to ensure that the contaminated unconfined aquifer is restored to drinking water standards and to ensure that drinking water standards are maintained for a period of time even beyond the achievement of the cleanup goals. Reagent injection will alter the groundwater chemistry and groundwater monitoring of all COCs is necessary to ensure that the remedy does not adversely affect the aquifer and result in unexpected mobilization of contaminants.

<u>Comments received by EPA via e-mail</u>

Comment #1 : Several citizens requested copies of documents contained in the Administrative Record for the NL Site.

EPA Response: EPA provided the documents electronically, where appropriate. If the document was not able to be sent electronically, the citizens were directed to either submit a Freedom of Information Act Request or visit one of the site repositories to view the documents.

Comment #2: A citizen asked what the reagent was for the reagent injection remedy.

EPA Response: A Bench Scale Treatability Study (BSTS) was conducted and included in the Focused Feasibility Study Report for the NL Site to investigate potential reagents. The BSTS indicated that tri-sodium phosphate would be a good candidate for a reagent; however, the final decision regarding the reagent to be used at the Site would be determined in a pilot study to be performed in the remedial design phase of the project.

Comment #3: A citizen wanted to know if a price contractor had been chosen to manage the site. The citizen was interested in a chance to bid on the site work.

EPA Response: The NL Site activities have been funded and performed by a group of Potentially Responsible Parties (PRPs), with EPA oversight to date. EPA expects to enter into a legal agreement with the PRPs to implement the groundwater remedy which is the subject of this ROD Amendment. If the PRPs accept the terms of the legal agreement, they will continue to fund and perform the next phase of work at the NL Site and EPA would not expect to control the hiring of contractors for work at the Site. Rather, EPA would continue to review the documents and plans prepared by the PRPs and oversee the field activities and the PRPs would control the hiring of contractors.

Attachment A

July 2011 Proposed Plan for the NL Site

Superfund Program
Proposed Plan

U.S. Environmental Protection Agency, Region 2

NL Industries, Inc. Superfund Site
July 2011

EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan identifies the U.S. Environmental Protection Agency's (EPA's) proposed change to the groundwater remedy selected in the July 8, 1994 Record of Decision (ROD) for the NL Industries Inc., Superfund Site (Site), in Pedricktown, Salem County, New Jersey. This document is issued by EPA, the lead agency for Site activities, and the New Jersey Department of Environmental Protection (NJDEP), the support agency. EPA, in consultation with NJDEP, will select the final remedy for the Site, documented in a Record of Decision Amendment, after reviewing and considering all information submitted during a 30-day public comment period. EPA, in consultation with NJDEP, may modify the preferred alternative or select another action presented in this Proposed Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all the alternatives presented in this document.

EPA is addressing the cleanup of the entire Site in two phases, called Operable Units. This Proposed Plan is for the groundwater component of Operable Unit 1 (OU1). OU1 addresses surface water, soils, stream sediments, and groundwater. The cleanup activities for the surface water, soils and stream sediments were completed in 2003. Operable Unit 2 (OU2) was completed in 1995 and addressed slag and lead oxide piles, contaminated surfaces and debris, and contaminated standing water. The OU1 surface water, soils and stream sediments along with OU2, are not the subject of this Proposed Plan.

As part of the OU1 ROD, EPA selected an extraction and treatment system to treat groundwater on-site from the unconfined aquifer and to discharge the treated groundwater to the Delaware River. The primary contaminants of concern in the groundwater are lead and cadmium. The treatment process for the pump and treat system was to include precipitation, clarification, and filtration. To date, the groundwater portion of the remedy has not been implemented.

During the OU1 cleanup activities for surface water, soils and stream sediments, groundwater continued to be monitored to ensure it was not impacting the drinking water of private residences and to evaluate the status of the contaminant plume. After the removal of the contaminated source material, it was noted that groundwater quality continued to improve over time. Accordingly, cleanup techniques, other than the pump and treat technology were evaluated for use at the Site.

This Proposed Plan describes the groundwater portion of the remedy that was initially selected in the 1994 OU1 ROD and explains why other remedial technologies are now being considered to address Site groundwater contamination. EPA's preferred groundwater remedy involves the injection of a reagent into the groundwater that will expedite and facilitate the precipitation of metal compounds (including lead and cadmium) and remove the contaminants from groundwater through adsorption to aquifer materials.

MARK YOUR CALENDAR

PUBLIC COMMENT PERIOD:
June 22, 2011 – July 21, 2011
EPA will accept written comments on the Proposed Plan during the public comment period.

PUBLIC MEETING: July 7, 2011
EPA will hold a public meeting to explain the Proposed Plan and all of the alternatives presented in the Feasibility Study. Oral and written comments will also be accepted at the meeting. The meeting will be held in the cafeteria of the Oldmans Township School, 10 Freed Road, Pedricktown, New Jersey at 6:30 pm.

For more information, see the Administrative Record at the following locations:

U.S. EPA Records Center, Region 2
290 Broadway, 18th Floor.
New York, New York 10007-1866
(212) 637-4308
Hours: Monday-Friday - 9 am to 5 p.m., by appointment.

Penns Grove Public Library,
222 South Broad Street,
Penns Grove, New Jersey 08069
(856) 299-4255
http://www.pgcplibrary.org/

EPA is issuing this Proposed Plan as part of its community relations program under Section 117(a) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, or Superfund). This Proposed Plan summarizes information that can be found in greater detail in the OU1 Focused Feasibility Study for Groundwater Remediation (FFS) report as well as in other documents contained in the Administrative Record for this Site (see box on previous page).

SITE DESCRIPTION

The Site is located to the north of the Pennsgrove-Pedricktown Road, in Pedricktown, Oldmans Township, Salem County, New Jersey. It is bisected by an active railroad. Approximately 16 acres are located north of the railroad tracks, including a closed 5.6-acre landfill that is not part of the Superfund Site. The southern 28 acres contain the former industrial area and the landfill access road. NL Industries maintains the landfill area and operates the landfill's leachate collection system with NJDEP oversight. The West and East Streams, parts of which are intermittent tributaries of the Delaware River, border and receive surface runoff from the Site. Wetland areas are located along the West Stream. Industrial properties are located east of the former NL Industries process area. U.S. Route 130 is located north of the Site. Several residential properties are located along Route 130 and adjacent to and west of the West Stream. Other properties in the general vicinity of the Site are used for commercial, residential, agricultural, and military purposes (See Figure 1).

SITE HISTORY

Between 1972 and 1984, NL Industries, Inc. and subsequently National Smelting of New Jersey (NSNJ), conducted secondary lead smelting and lead-acid battery reclamation operations. As a result of these operations, soil at the Site was contaminated with metals, primarily lead. In addition, elevated levels of lead, copper and zinc were detected in stream sediment and surface water. Groundwater contamination detected at the Site consisted primarily of lead and cadmium, with localized areas of elevated levels of volatile organic compounds (VOCs).

The Site was listed on the National Priorities List (NPL) in 1983 and a remedial investigation (RI) and feasibility study (FS) were conducted between 1986 and 1993. Between 1989 and 1996, EPA conducted multi-phased cleanup activities at the Site to address immediate public health concerns. Activities included, but were not limited to, the construction of security fences, encapsulation of slag (byproduct of smelting operations) piles, removal of toxic materials, demolition of buildings, and removal of the most highly contaminated stream sediments.

EPA divided the Site into two Operable Units to facilitate remedial activities. A ROD for OU2 was issued by EPA in 1991 and addressed slag and lead oxide piles, contaminated surfaces and debris, and contaminated standing water. OU2 activities were initiated in 1992 and included off-site reclamation of lead-containing materials, solidification/stabilization and off-site disposal of slag and other materials, decontamination of building floors and surfaces, off-site treatment and disposal of contaminated standing water, building demolition, and environmental monitoring. The OU2 activities were completed in September 1995.

The ROD for OU1 was signed in 1994 and addressed the remediation of soil, groundwater, surface water, and stream sediment. OU1 activities for the soil and stream sediment were initiated in January 2000. Remedial Action Objectives (RAOs) for OU1 included the following: 1) to leave no greater than 500 parts per million (ppm) of lead remaining in site soils and stream sediments; and 2) to restore the contaminated unconfined aquifer to drinking water standards for all contaminants. Established cleanup standards for each contaminant of concern (COC) for groundwater were listed in the ROD. To date, the groundwater portion of the remedy has not been implemented while the surface water and soils source removals were performed. Note that an Explanation of Significant Differences (ESD) was issued in 1999 and pertained to the soil/sediment portion of the remedy selected in the 1994 ROD. The ESD documented the change from disposing of excavated soil/sediment in an on-site landfill to the disposal of excavated soil/sediment to an off-site landfill.

<u>OU1 Soil/Sediment Activities</u>

Remedial activities included the excavation of soil and sediment containing greater than 500 ppm of lead, as stated in the OU1 RAOs. The soil and sediment remedial activities for OU1 were completed in July 2003 and a biological monitoring plan was initiated. Recent sampling showed that there are lead levels in the sediment above the cleanup standards in a portion of the West Stream between Pennsgrove–Pedricktown Road and Route 130. This contaminated sediment will require additional remediation, which is scheduled for the summer of 2011. The soil/sediment activities are not the subject of this Proposed Plan and will therefore not be discussed in further detail.

<u>OU1 Groundwater Activities</u>

OU1 groundwater monitoring was initially conducted during the RI in 1988 and 1989. Site-related contaminants were detected in the groundwater of the unconfined aquifer at the Site during the RI and the data indicated that the contamination in groundwater was limited to the unconfined aquifer. The contaminants detected in the unconfined aquifer were comprised primarily of lead and cadmium; however, VOCs, arsenic and radiological parameters were also detected in localized areas of the Site. Arsenic was later determined to be related to landfill leachate. Subsequent improvements were made to the landfill, eliminating the seeps and the arsenic detections.

As part of the remedial design (RD), two phases of groundwater evaluations were conducted. Phase I was conducted in 1997. Twenty groundwater samples were collected and analyzed for VOCs, semi-volatile organic compounds (SVOCs), total and dissolved metals, cyanide and radiological parameters. Water quality parameters, such as pH and oxidation-reduction potential, were also monitored. Phase I sampling identified the relationship between pH and metal solubility in groundwater. Low groundwater pH was correlated with higher concentrations of lead and cadmium. The Phase I sampling also indicated that concentrations of COCs in groundwater at the Site had decreased since the late 1980's when the RI was conducted.

The Phase II groundwater evaluation was initiated in 1998 and included installation of additional monitoring wells, sampling of potable groundwater from residential wells along Route 130, aquifer testing, evaluation of the capture zone of groundwater extraction wells, geochemical evaluation of Site subsurface soils, and groundwater flow and transport modeling. As a result of Phase II analysis, radiological parameters were determined to be naturally occurring and not related to the Site and therefore required no further analysis. Aquifer testing revealed that there were adequate amounts of iron and manganese oxide/hydroxide coatings in the aquifer soils to provide adsorption capacity for lead and cadmium that is anticipated to precipitate out of groundwater or otherwise adsorb onto soil at the Site. Pump tests indicated that constant pumping of the contaminated groundwater was not highly efficient at removing lead and cadmium. It was calculated that it would take between 50 and 60 years of aggressive pumping to remove lead and cadmium from the groundwater and achieve cleanup standards. Furthermore, Phase II testing continued to show a decrease in the mass of lead and cadmium remaining in the groundwater.

The decreased contaminant concentrations observed in the Phase I and Phase II groundwater evaluations, as well the availability of newer remedial technologies, prompted the investigation into other potential groundwater remedies that may be more efficient than the pump and treat alternative selected in the 1994 OU1 ROD.

PRINCIPAL THREATS

The term "principal threat" waste usually applies to materials that are acting as a source of contamination. This Proposed Plan addresses groundwater contamination. Contaminated groundwater generally is not considered to be a source material and is therefore not categorized as a "principal threat."

WHAT IS A "PRINCIPAL THREAT"?

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP Section 300.430(a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to ground water, surface water or air, or acts as a source for direct exposure. Contaminated ground water generally is not considered to be a source material; however, Non-Aqueous Phase Liquids (NAPLs) in ground water may be viewed as source material. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of the alternatives using the nine remedy selection criteria This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

SITE CHARACTERISTICS

Groundwater contamination is limited to the unconfined aquifer which is part of the Cape May Formation and averages approximately 20 feet in thickness. The unconfined aquifer has historically been subdivided into two zones, the shallow and deep zones, which are screened between approximately 5 feet and 50 feet below grade. The terms shallow and deep relate to screened intervals of monitoring wells and not to geologic materials.

Groundwater flow direction in the unconfined aquifer, as inferred based on groundwater elevation data, is primarily west across the Site towards the West Stream. The groundwater flow rate is approximately 27.5 feet per year; however, contaminants do not flow at this rate since other reactions, such as adsorption, limit the mobility of lead and cadmium, which are the primary COCs.

In addition to groundwater sampling in the 1980's and 1990's, groundwater monitoring was conducted in 2004, 2007 and 2010. Data from all groundwater monitoring events indicate that the lead and cadmium concentrations have generally decreased over time and that the majority of the contaminated groundwater is located beneath the former facility area. Significant migration of contaminants has not been observed in recent sampling events. Between 1983 and 2010, the mass of lead in the groundwater decreased from approximately 220 pounds to 2.7 pounds. For cadmium, the mass has decreased from approximately 70 pounds in 1988 to 5.9 pounds in 2010. The current volume of groundwater impacted by lead is approximately 1.5 million gallons and 11.8 million gallons for cadmium.

Residential groundwater sampling was also conducted in 2004, 2006, 2007 and 2010 for those residences located north of the Site along Route 130. During each of these monitoring events, lead and cadmium concentrations in the residential water samples were either not detected, were significantly below the applicable New Jersey drinking water standards, or had minor detections believed to be a result of plumbing issues as opposed to site-related contaminant detections.

Removal of contaminated source material, as a result of OU1 soil/sediment and OU2 activities, has resulted in the observed significant decrease in lead and cadmium groundwater concentrations. It has also allowed for pH values to begin equilibrating. The increasing pH values can also account for the continued decrease in lead and cadmium concentrations in groundwater. At low pH, metals are more soluble and tend to stay in solution. At higher pH values, the metals tend to adsorb to the aquifer soils. Oxidation-Reduction potential (Eh) also contributes to metal solubility.

While lead and cadmium have significantly decreased over time, the concentrations still exceed the current drinking water standards.

VOCs have historically been detected at the Site in localized areas. Total VOC concentrations have generally decreased over time via natural attenuation processes and these concentrations are expected to continue to decrease. Groundwater data collected in 2010 indicate that vinyl chloride and tetrachloroethene are the only site-related VOCs detected above the drinking water standards. Further, these two contaminants have been detected at only three of the twenty-eight groundwater monitoring wells at concentrations slightly exceeding the drinking water standards. All COCs initially listed in the ROD, including vinyl chloride, will continue to be monitored to ensure that cleanup levels are achieved.

SCOPE AND ROLE OF THIS ACTION

This is a proposed amendment to the July 8, 1994 ROD for the NL Industries, Inc. Superfund Site. The 1994 ROD selected extraction and treatment of groundwater to address the threats posed by contaminated groundwater in the unconfined aquifer. However, groundwater monitoring data, including the most recent December 2010 data, indicate that the concentrations of COCs have significantly decreased over time and new technologies for remediation of contaminated groundwater have been developed, leading EPA to investigate alternative groundwater remedies that may be more efficient than extraction and treatment to address the remaining contaminated groundwater.

A summary of the investigated alternative remedies is presented below along with an assessment of EPA's preferred alternative.

SUMMARY OF OPERABLE UNIT 1 RISKS

The purpose of the risk assessment is to identify potential cancer risks and non-cancer health hazards at the Site assuming that no further remedial action is taken. A baseline risk assessment was conducted as part of the RI (O'Brien and Gere, 1990) and was based on COC concentrations from groundwater samples collected in 1989. The baseline risk assessment addressed the potential risks to human health by identifying potential exposure pathways by which the public may be exposed to contaminated groundwater (via ingestion). Groundwater exposures were assessed for both potential present and future land-use scenarios. Current land use was considered to be an industrial facility and future land use was characterized as either an industrial facility or residential area in the risk assessment. Current receptors included off-site residents (child and adult) and off-site workers. Future receptors included on-site residents (child and adult), off-site residents (child and adult), on-site workers and off-site workers. Results of the quantitative risk assessment concluded that there was an unacceptable risk for the potential future receptors due to exposure to contaminated groundwater via ingestion, with the exception of the on-site worker. The potential exposure pathways, land-use scenarios and receptors identified in the 1990 risk assessment remain applicable for the Site; therefore, the original risk assessment is still valid. An ecological risk assessment was also conducted in 1992. It was determined that the two media potentially posing a risk to ecological receptors were the stream sediment and wetland soils. Groundwater was not found to be posing a significant ecological risk.

The unconfined aquifer at the site is classified as a Class II aquifer in the state of New Jersey. The designated use of Class II groundwaters is to provide potable water and this is considered to be the most beneficial use for the aquifer. Accordingly, while the groundwater at the site is not currently being used for drinking water, the goal is to restore the aquifer to its most beneficial use.

A review of the most recent groundwater data reveals that the concentrations of COCs, primarily cadmium and lead, continue to exceed their respective NJDEP Groundwater Quality Criteria and Federal Maximum Contaminant Levels. These standards were promulgated to ensure that public water systems used as potable water sources remain protective of human health by limiting levels of contaminants in the drinking water. The RAO for the Site is to restore the site-related contaminated portions of the unconfined aquifer to drinking water standards for all contaminants; this RAO has not yet been met for all of the constituents. Therefore, unacceptable human health risk to a potentially exposed population from direct exposure to groundwater remains. It is EPA's current judgment that a remedy is required to restore groundwater and achieve the RAOs, and is necessary in order to protect human health and the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), to-be-considered guidance, and site-specific risk-based levels.

The following RAOs have been identified for groundwater at the Site:

- Restore the contaminated unconfined aquifer to drinking water standards for all contaminants;
- Minimize the potential for migration of contaminants of concern in groundwater; and
- Prevent or minimize potential future human exposures, including ingestion of groundwater, which presents an unacceptable risk to public health and the environment.

The cleanup of groundwater at this Site is primarily based on the remediation of lead and cadmium, which are the primary contaminants of concern, to concentrations that meet established drinking water standards. The risk should be eliminated by meeting the most stringent of the Federal Maximum Contaminant Levels (MCLs), the New Jersey MCLs and the New Jersey Groundwater Quality Standards (NJGWQS) for all contaminants of concern. For lead and cadmium, the most stringent standards are the NJGWQS which are 5 parts per billion (ppb) and 4 ppb, respectively.

SUMMARY OF REMEDIAL ALTERNATIVES

Potential applicable technologies were identified and screened using effectiveness, implementability and cost as the criteria, with emphasis on the effectiveness of the remedial action. Those technologies that passed the initial screening were then assembled into four remedial alternatives.

The time frames below for construction do not include the time for designing the remedy, nor do they include the time to procure necessary contracts.

Alternative 1 - No Action

The No Action alternative was retained for comparison purposes as required by the National Oil and Hazardous Substance Pollution Contingency Plan (NCP). Under the No Action Alternative, no remedial actions would be taken to address groundwater contamination. Institutional and engineering controls would not be implemented to restrict the use or access to contaminated groundwater. Furthermore, there would be no monitoring associated with this alternative to evaluate progress toward achieving the RAOs.

Total Capital Cost	$0
Operation and Maintenance	$0
Total Present Net Worth	$0
Timeframe	0 years

Alternative 2 – Monitored Natural Attenuation Plus Institutional Controls

In this alternative, Monitored Natural Attenuation (MNA) involves the reliance on natural attenuation processes to achieve the Site-specific remediation objectives. Natural attenuation processes include biochemical reactions, dispersion, dilution and sorption processes that occur naturally in the subsurface and serve to reduce contaminant levels from groundwater at the Site. Adsorption appears to be the primary mechanism of MNA attributing to decreased contaminant concentrations at the Site. The MNA alternative would also include a monitoring plan to track contaminant concentrations and determine when the cleanup standards have been achieved. Furthermore, this alternative would include the implementation of institutional controls, such as a Classification Exception Area (CEA), to limit access and potential use of impacted groundwater at the Site. This would protect human health and the environment until cleanup standards are achieved.

Total Capital Cost	$163,399
Operation and Maintenance	$1,049,805
Total Present Net Worth	$1,213,204
Timeframe	>50 years

Alternative 3 – Reagent Injection Plus Institutional Controls

Reagent injection involves the introduction of a reagent into the water table aquifer using injection wells or well points. The reagent injection technique is based on the fact that metals dissolved or entrained in groundwater may react to form insoluble compounds and precipitate, or otherwise be immobilized by adsorption onto a substrate and/or by incorporating the metal into a molecular structure (intercalation) which may then adsorb or become incorporated into the soil as a complex or precipitate. Based on preliminary bench-scale treatability studies, it appears that phosphate reagents would be highly effective at binding both lead and cadmium in less soluble metal complexes in the groundwater. A more alkaline environment (pH of approximately 8.0 – 9.0) would be created through addition of a basic compound to promote reactions between the native metals and the soil. This increased pH value is not required to be maintained following reagent injection and would return to ambient levels (pH 5.0 – 6.0) over time. The reagent (likely phosphate) would then be introduced to promote intercalation reactions to more permanently remove lead and cadmium from the groundwater. This remedial alternative would also include continued monitoring of all COCs initially listed in the 1994 ROD, including site-related VOCs. The low concentrations of VOCs observed in recent groundwater monitoring data are expected to continue to decrease to acceptable levels via natural attenuation processes.

Effectiveness of this remedial alternative would be assessed by periodic groundwater sampling and analysis to ensure that cleanup goals are achieved for all COCs. This alternative would also include implementation of institutional controls, such as a CEA, to limit access and potential use of impacted groundwater at the Site. This would protect human health and the environment until cleanup standards are achieved.

Total Capital Cost	$890,489
Operation and Maintenance	$684,766
Total Present Net Worth	$1,575,255
Timeframe	<10 years

Alternative 4 – Pump and Treat Plus Institutional Controls

In this alternative, a well point system would be used to pump contaminated groundwater into a treatment plant which would be constructed on-site. This was the remedy selected in the 1994 ROD and is presented here again for the purpose of comparing this remedy to the other alternatives. The treatment steps initially described in the 1994 ROD included a 250 gallon per minute pump rate and precipitation/flocculation followed by an ion-exchange polishing step. Following treatment, the water would be pumped to the Delaware River and discharged. An effluent outfall would be constructed at the discharge location. The distance from the Site to the Delaware River is approximately 1.5 miles.

Effectiveness of the pump and treat alternative would be assessed by periodic groundwater sampling and analysis. This alternative would also include implementation of institutional controls, such as a CEA, to limit access and potential use of impacted groundwater at the Site. This would protect human health and the environment until cleanup standards are achieved.

Total Capital Cost	$1,560,298
Operation and Maintenance	$4,128,108
Total Present Net Worth	$5,688,406
Timeframe	>50 Years

EVALUATION OF ALTERNATIVES

EPA uses nine evaluation criteria to assess remedial alternatives individually and against each other in order to select a remedy. The criteria are described in the box on the next page. This section of the Proposed Plan profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other options under consideration. A detailed analysis of each of the alternatives is presented in the Focused Feasibility Study for Groundwater Remediation report which can be found in the Administrative Record.

Overall Protection of Human Health and the Environment

Alternative 1 - No Action will not be protective of human health and the environment because this alternative does not include implementation of institutional controls to restrict the use of contaminated groundwater and does not include monitoring to determine when the applicable standards have been met and the RAOs have been achieved. Alternative 2 – MNA Plus Institutional Controls, Alternative 3 – Reagent Injection Plus Institutional Controls and Alternative 4 – Pump and Treat Plus Institutional Controls are all protective of human health and the environment as they all include institutional controls to restrict the use of groundwater until cleanup goals are met, will result in the decrease of site-related contaminants and include a monitoring plan to determine when the RAOs have been achieved. However, Alternatives 2, 3 and 4 are estimated to achieve the cleanup standards in varying lengths of time.

Compliance with Applicable or relevant and Appropriate Requirements (ARARs)

Alternative 1, No Action, would not comply with ARARs since a determination as to whether or not the applicable standards have been met would not be able to be made due to the lack of monitoring. Alternatives 2, 3 and 4 are

THE NINE SUPERFUND EVALUATION CRITERIA

1. **Overall Protectiveness of Human Health and the Environment** evaluates whether and how an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

2. **Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)** evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.

3. **Long-term Effectiveness and Permanence** considers the ability of an alternative to maintain protection of human health and the environment over time.

4. **Reduction of Toxicity, Mobility, or Volume (TMV) of Contaminants through Treatment** evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

5. **Short-term Effectiveness** considers the length of time needed to implement an alternative and the risks the alternative poses to workers, the community, and the environment during implementation.

6. **Implementability** considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

7. **Cost** includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

8. **State/Support Agency Acceptance** considers whether the State agrees with the EPA's analyses and recommendations, as described in the RI/FS and Proposed Plan.

9. **Community Acceptance** considers whether the local community agrees with EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

expected to comply with the applicable ARARs including the NJGWQS. Alternative 4 would also comply with New Jersey Pollution Discharge Elimination System (NJPDES) regulations for off-site discharge of treated groundwater to the Delaware River as well as Resource Conservation and Recovery Act (RCRA) regulations for wastes generated from the pump and treat operations.

Long-Term Effectiveness and Permanence

The highest degree of permanence and long-term effectiveness is achieved for those alternatives that result in the greatest removal of contaminants from the Site. Alternative 1, No Action, does not provide a mechanism to monitor contaminant migration or attenuation; therefore long-term effectiveness and permanence cannot be determined. Alternative 2 – MNA Plus Institutional Controls, Alternative 3-Reagent Injection Plus Institutional Controls and Alternative 4-Pump and Treat Plus Institutional Controls are all expected to mitigate long-term risks from site contaminants; however, Alternative 3 – Reagent Injection Plus Institutional Controls has a higher degree of permanence due to the chemical reaction with the reagent in which the primary contaminants of concern, lead and cadmium, are bound in less soluble metal complexes in the groundwater.

The Alternative 3 reagent injection technology permanently removes cadmium and lead from solution by precipitating them as metal phosphates. The metals are incorporated into a crystalline lattice using the phosphate precipitation process. Metal phosphates are highly insoluble and, it has been suggested, that their low solubility renders metals in metal phosphates non-bioavailable. Over the long-term, it is anticipated that the pH levels in groundwater at the Site will equilibrate to ambient levels, typically between pH 5 and 6. The ambient pH will not cause any significant resolubilization of lead or cadmium after the metals have reacted to form metal phosphate compounds and/or these phosphate compounds have adsorbed to the aquifer materials. Resolubilization is a potential concern with Alternative 2, MNA. If there were to be a scenario where there was a significant shift in pH toward acidic conditions, the pH shift could potentially cause desorption of lead and cadmium from aquifer surfaces. Alternative 4 – Pump and Treat, requires a significantly longer period of time to meet the applicable standards and is therefore not as efficient in removing contaminants as Alternative 3 – Reagent Injection.

Reduction of Toxicity, Mobility, or Volume through Treatment

Groundwater concentrations of site-related contaminants have generally decreased over time, as evidenced through the groundwater monitoring events. Furthermore, there has been minimal migration of the groundwater plume. Alternative 1 – No Action and Alternative 2 – MNA Plus Institutional Controls do not involve active treatment processes and are therefore not discussed for comparison in this criterion. However, note that the No Action and MNA alternatives would not be expected to achieve cleanup goals in a reasonable timeframe. Alternative 3 – Reagent Injection Plus Institutional Controls and Alternative 4 – Pump and Treat Plus Institutional Controls are expected to reduce the toxicity, mobility or volume of contaminants to meet the applicable standards; however,

the Alternatives are estimated to achieve these reductions at different rates.
Alternative 4 – Pump and Treat Plus Institutional Controls is expected to take over 50 years to reduce the contaminant levels to concentrations meeting the applicable standards. Alternative 3 – Reagent Injection Plus Institutional Controls is expected to reduce contaminant levels to concentrations meeting the applicable standards in less than 10 years through active treatment. This increased rate of reduction is due to the mechanisms in which the primary contaminants of concern, lead and cadmium, will be removed from solution. Reagent injection utilizes both natural processes, including biochemical reactions, dispersion, dilution and sorption in addition to active treatment to enhance the formation of metal phosphates which eliminates the bioavailability of lead and cadmium in the aquifer.

Short-Term Effectiveness

With the exception of Alternative 1 – No Action, which has no impact on short-term effectiveness, all of the Alternatives (2, 3 and 4) are expected to have minimal impacts on remediation workers and nearby residents during remedy implementation. Alternative 2 – MNA and Alternative 3 – Reagent Injection mainly involve the installation of monitoring wells/injection points while Alternative 4 – Pump and Treat involves the construction of a groundwater treatment plant which is anticipated to take longer to construct and include more construction and physical disturbance at the Site.

The potential risks to Site workers and area residents during remedy implementation will be addressed by adherence to protective worker practices, safety standards, and equipment. A site-specific health and safety plan will be prepared and trained personnel will perform remedial activities. Appropriate personnel monitoring and emission controls and monitoring will be provided, as needed, during remedy implementation.

Implementability

All of the alternatives are technically and administratively feasible, have been implemented at other similar sites, and make use of standard engineering practices. Alternative 1 - No Action requires the least effort to implement; however, without having the monitoring component to determine effectiveness of the remedy, it would not demonstrate when RAOs have been met.

Alternative 2 – MNA Plus Institutional Controls would be the most readily implementable alternative as it only involves installation of monitoring wells and subsequent monitoring. Alternative 3 – Reagent Injection would require a pilot study to optimize its effectiveness as well as the installation of monitoring/injection wells. Alternative 4 – Pump and Treat Plus Institutional Controls would be the most difficult to implement as it would require the greatest degree of construction and acquisition of permits, such as the NJPDES permit for off-site discharge of the treated groundwater. The availability of service and materials required for the implementation of all alternatives is adequate. All alternatives, other than Alternative 1, require services and materials that are currently readily available from technology vendors, and are therefore, not expected to present a challenge to remedy implementation.

Cost

Alternative 1 - No Action has the lowest capital cost, but because of the lack of monitoring, achievement of remedial success could not be measured. Aside from Alternative 1 – No Action, Alternative 2 - MNA Plus Institutional Controls has the lowest capital cost of $163, 399 and would be the least costly alternative to implement with a total present net worth of approximately $1.2 million which includes a 30-year groundwater monitoring program and well installation. Alternative 3 – Reagent Injection Plus Institutional Controls is estimated to have a capital cost of $890,489 and an overall present net worth cost of approximately 1.6 million assuming a 10-year groundwater monitoring program. This is comparable to the cost of Alternative 2. Alternative 4 – Pump and Treat Plus Institutional Controls is the most expensive alternative with an estimated capital cost of $1.6 million and a present net worth cost of approximately $5.7 million which includes a 30-year groundwater monitoring program.

State/Support Agency Acceptance

The State of New Jersey concurs with the Preferred Alternative.

Community Acceptance

Community acceptance of the Preferred Alternative will be evaluated after the public comment period ends and will be described in the Record of Decision for this site. The Record of Decision is the document that formalizes the selection of the remedy for a site.

SUMMARY OF THE PREFERRED ALTERNATIVE

The Preferred Alternative for cleanup of the groundwater at the NL Industries, Inc. Superfund Site is Alternative 3 – Reagent Injection Plus Institutional Controls.

Reagent Injection is an *in-situ* treatment whereby a reagent is injected into the groundwater aquifer via injection wells or well points. The reagent applied will be selected based upon the results of the bench-scale treatability study (BSTS), as presented in the Focused Feasibility Study for Groundwater Remediation (FFS), and a field pilot study, which will be conducted as part of the Remedial Design. Preliminarily, the results of the BSTS reveal that phosphate reagents will be highly effective for treating lead and cadmium in groundwater. The use of phosphates for treating impacted soils and waters has been widely used to immobilize inorganic constituents, including lead. The field pilot study will confirm effectiveness at the Site and assist in calculating parameters required for successful remediation (i.e., number of well points, spacing, application method, etc.).

The reagent injection technique is based on the fact that metals dissolved or entrained in groundwater may react to form insoluble compounds and precipitates, or otherwise be immobilized by adsorption onto a substrate (i.e., the native soil) and/or by incorporating the metal into a molecular structure (intercalation) which may then adsorb or become incorporated into soil as a complex or precipitate. Reactions with phosphates tend to result in intercalation under proper conditions.

In order to promote the desired reactions, a more alkaline environment (pH of approximately 8.0 – 9.0) will be created prior to the reagent injection through addition of a basic compound into the groundwater aquifer to foster reactions between the native metals and the soil. The increased pH value is not required to be maintained following reagent injection and will return to ambient levels (i.e., pH of approximately 5.0 – 6.0) over time. The reagent will then be injected into the groundwater aquifer via a number of injection points. Generally speaking, precipitation reactions, such as those induced through certain injection reagents, including phosphates, follow a kinetic order of reaction. The order of reaction varies from compound to compound and with the geochemical conditions in which the reagent is applied (e.g., pH and reagent concentration); however, with the current Site conditions and concentrations of lead and cadmium in groundwater, it is anticipated that lead and cadmium will react with the phosphates first, followed by the non-target compounds (i.e., calcium and aluminum). This remedial alternative will also include continued monitoring of all COCs initially listed in the 1994 ROD, including site-related VOCs. The low concentrations of VOCs detected in recent groundwater monitoring data are expected to continue to decrease to acceptable levels via natural attenuation processes.

The effectiveness of the preferred alternative will be assessed by periodic groundwater sampling and analysis. Quarterly sampling is proposed initially; however, the monitoring frequency will be modified based upon the data obtained during the pilot study and initial post-reagent injection monitoring events.

Institutional controls will also be implemented to prevent exposure to contaminated groundwater until the cleanup standards have been achieved for all COCs.

This alternative is estimated to take less than 10 years to achieve the cleanup standards. Therefore, as per EPA policy, 5-Year Reviews will be performed until remedial goals are achieved.

The preferred remedy was selected over other remedies because it is expected to achieve substantial and long-term risk reduction through treatment in the most efficient and timely manner.

Based on information currently available, EPA believes the Preferred Alternative meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. EPA expects the Preferred Alternative will satisfy the statutory requirements of CERCLA Section 121(b); however, Alternative 4 – Pump and Treat Plus Institutional Controls will be retained as a contingency remedy.

Consistent with EPA Region 2's Clean and Green policy, EPA will evaluate the use of sustainable technologies and practices with respect to implementation of the selected remedy.

COMMUNITY PARTICIPATION

EPA and NJDEP provided information regarding the cleanup of the NL Industries, Inc. Superfund Site to the public through meetings, the Administrative Record file for the site, mailings and announcements published in *Today's Sunbeam*. EPA and NJDEP encourage the public to gain a more comprehensive understanding of the Site and the Superfund activities that have been conducted there.

For further information on EPA's Preferred Alternative for the NL Industries, Inc. Superfund Site, please contact one of the following:

Theresa Hwilka	Natalie Loney
Remedial Project Manager	Community Relations
(212) 637-4409	(212) 637-3639

U.S. EPA
290 Broadway 19th Floor
New York, New York 10007-1866

The dates of the public comment period; the date, the location and the time of the public meeting; and the locations of the Administration Record files are provided on the front page of this Proposed Plan.

NL Industries, Inc. Superfund Site information and reports can also be found online at the following address:

http://www.epa.gov/region02/superfund/npl/nlindustries/pdf/PRAP.pdf

GLOSSARY

ARARs: Applicable or Relevant and Appropriate Requirements. These are Federal or State environmental rules and regulations that may pertain to the Site or a particular alternative.

Carcinogenic Risk: Cancer risks are expressed as a number reflecting the increased chance that a person will develop cancer if exposed to chemicals or substances. For example, EPA's acceptable risk range for Superfund hazardous waste sites is 1 x 10^{-4} to 1 x 10^{-6}, meaning there is 1 additional chance in 10,000 (1 x 10^{-4}) to 1 additional chance in 1 million (1 x 10^{-6}) that a person will develop cancer if exposed to a Site contaminant that is not remediated.

CERCLA: Comprehensive Environmental Response, Compensation and Liability Act. A Federal law, commonly referred to as the "Superfund" Program, passed in 1980 that provides for response actions at sites found to be contaminated with hazardous substances, pollutants or contaminants that endanger public health and safety or the environment.

COPC: Chemicals of Potential Concern.

SLERA: Screening Level Ecological Risk Assessment. An evaluation of the potential risk posed to the environment if remedial activities are not performed at the Site.

FS: Feasibility Study. Analysis of the practicability of multiple remedial action options for the Site.

Groundwater: Subsurface water that occurs in soils and geologic formations that are fully saturated.

HHRA: Human Health Risk Assessment. An evaluation of the risk posed to human health should remedial activities not be implemented.

HI: Hazard Index. A number indicative of noncarcinogenic health effects that is the ratio of the existing level of exposure to an acceptable level of exposure. A value equal to or less than one indicates that the human population is not likely to experience adverse effects.

HQ: Hazard Quotient. HQs are used to evaluate noncarcinogenic health effects and ecological risks. A value equal to or less than one indicates that the human or ecological population are not likely to experience adverse effects.

ICs: Institutional Controls. Administrative methods to prevent human exposure to contaminants, such as by restricting the use of groundwater for drinking water purposes.

Nine Evaluation Criteria: See text box on Page 7.

Noncarcinogenic Risk: Noncancer Hazards (or risk) are expressed as a quotient that compares the existing level of exposure to the acceptable level of exposure. There is a level of exposure (the reference dose) below which it is unlikely for even a sensitive population to experience adverse health effects. USEPA's threshold level for noncarcinogenic risk at Superfund sites is 1, meaning that if the exposure exceeds the threshold; there may be a concern for potential noncancer effects.

NPL: National Priorities List. A list developed by USEPA of uncontrolled hazardous substance release sites in the United States that are considered priorities for long-term remedial evaluation and response.

Operable Unit (OU): a discrete action that comprises an incremental step toward comprehensively addressing site problems. This discrete portion of a remedial response manages migration, or eliminates or mitigates a release, threat of a release, or pathway of exposure. The cleanup of a site can be divided into a number of operable units, depending on the complexity of the problems associated with the site.

Present-Worth Cost: Total cost, in current dollars, of the remedial action. The present-worth cost includes capital costs required to implement the remedial action, as well as the cost of long-term operations, maintenance, and monitoring.

Proposed Plan: A document that presents the preferred remedial alternative and requests public input regarding the proposed cleanup alternative.

Public Comment Period: The time allowed for the members of a potentially affected community to express views and concerns regarding USEPA's preferred remedial alternative.

RAOs: Remedial Action Objectives. Objectives of remedial actions that are developed based on contaminated media, contaminants of concern, potential receptors and exposure scenarios, human health and ecological risk assessment, and attainment of regulatory cleanup levels.

Record of Decision (ROD): A legal document that describes the cleanup action or remedy selected for a site, the basis for choosing that remedy, and public comments on the selected remedy.

Remedial Action: A cleanup to address hazardous substances at a site.

RI: Remedial Investigation. A study of a facility that supports the selection of a remedy where hazardous substances have been disposed or released. The RI identifies the nature and extent of contamination at the facility and analyzes risk associated with COPCs.

TBCs: "To-be-considereds," consists of non-promulgated advisories and/or guidance that were developed by EPA, other federal agencies, or states that may be useful in developing CERCLA remedies.

USEPA: United States Environmental Protection Agency. The Federal agency responsible for administration and enforcement of CERCLA (and other environmental statutes and regulations), and final approval authority for the selected ROD.

VOC: Volatile Organic Compound. Type of chemical that readily vaporizes, often producing a distinguishable odor.

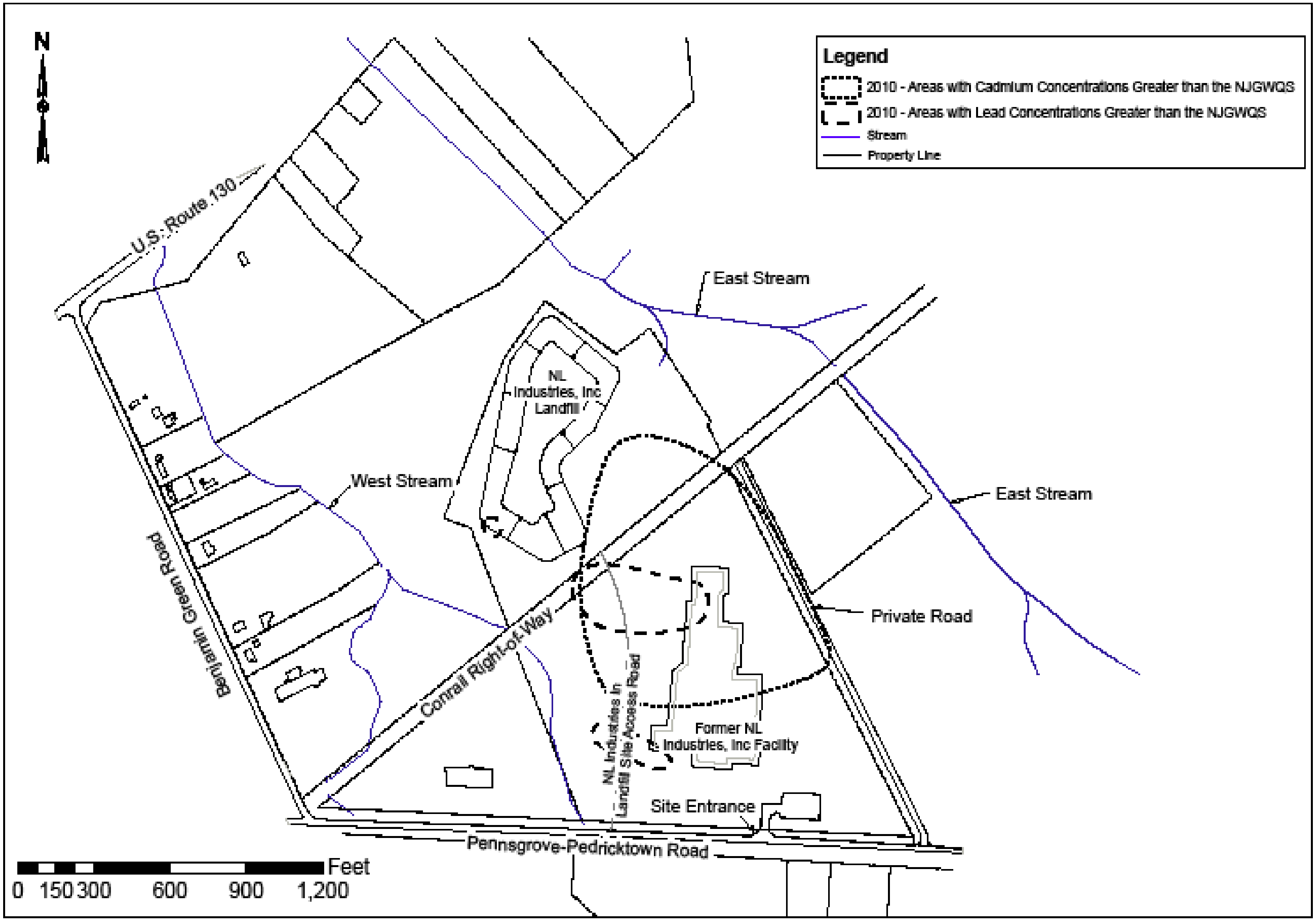

Figure 1 – NL Industries, Inc. Superfund Site Map

Attachment B

Public Notice published in Today's Sunbeam

EPA IS HOSTING A PUBLIC MEETING FOR THE NL INDUSTRIES SUPERFUND SITE

The U.S. Environmental Protection Agency invites you to attend a public meeting to discuss EPA's proposed remedy to address a change to the groundwater remedy at the NL Industries Superfund Site in Pedricktown, New Jersey. EPA's preferred remedy, which is described in the Proposed Plan, is

Alternative 3: Reagent Injection Plus Institutional Controls.

The public meeting will be held at the:

Oldmans Township School
School Cafeteria
10 Freed Road
Pedricktown, NJ 08067
on Thursday, July 7, 2011
at 6:30 PM

Before selecting the final remedy, EPA will consider oral comments presented at the public meeting and written comments received during the thirty (30) day comment period. The comment period for the proposed plan runs from **June 22, 2011** to **July 21, 2011**. Copies of the Proposed Plan and the Administrative Record for the site are available at the following locations:

Penns Grove Public Library
222 South Broad Street
Penns Grove, New Jersey 08069

US EPA Records Center
290 Broadway, 18th Floor
New York, New York 10007-1866
212-637-4308
By Appointment Only

Or you can access a copy of the Proposed Plan at:
http://www.epa.gov/region02/superfund/npl/nlindustries/pdf/PRAP.pdf

Written comments should be sent to: **Theresa Hwilka, Remedial Project Manager, U.S. EPA, 290 Broadway, 19th Floor, New York, NY 10007-1866, (v) 212-637-4409, fax 212-637-4429**

Or you can e-mail your comments to:

hwilka.theresa@epa.gov

If you have any questions regarding the information session you can, e-mail Ms. Natalie Loney, Community Involvement Coordinator at:

loney.natalie@epa.gov

or call Ms. Loney: (212) 637-3639 or toll-free at 1-800-346-5009.

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Attachment C

July 7, 2011 Public Meeting Attendance Sheet

EPA

NL INDUSTRIES SUPERFUND SITE
PUBLIC MEETING
JULY 7, 2011@ 6:30 PM
Oldmans Township School
10 Freed Road
Pedricktown, NJ 08067

PLEASE PRINT CLEARLY

NAME	ADDRESS (with Zip Code)	E-mail	Organization
Janice Frisby-Dowe	126 Perkintown Rd Pedricktown 08067	Jfrisbydowe@yahoo.com	Resident
Joyce Reed	62 Perkintown Rd Pedrick	ReedFamily51@comcast.net	Resident
T[illegible] Kulowski	191 Rt 130	TKulowski@[illegible]	Resident
Patricia Griffin	72 Dasher Ave Bear, DE 19701 for Property @ 19 New Rd.	pawg4@aol.com	Property Owner
Edna Klimek	221 P.G./Auburn Rd		"
Bill Sussel	155 Perkintown Rd.	Elect.design@comcast.net	Re

* SEND COPY OF PROPOSED PLAN.

500489

EPA

NL INDUSTRIES SUPERFUND SITE
PUBLIC MEETING
JULY 7, 2011@ 6:30 PM
Oldmans Township School
10 Freed Road
Pedricktown, NJ 08067

PLEASE PRINT CLEARLY

NAME	ADDRESS (with Zip Code)	E-mail	Organization
Clinton Jones	63 Perkintown Rd Pedricktown N.J. 08067		
Lester KYLE	129 PerKintown RD.		
Melinda Taylor	41 E Mill St		M[illegible]
William Miller	16 Benjamin Green Rd 08067		Township
Ron Nipe	220 Perkintown Rd		
Gladys Fields	12 Pennsv- PedTN Rd.		
Susan Kaye	187 N. Railroad Ave Pedricktown	susankaye1@gmail.com	
Jim NIPE	12 PENNSGROVE PED. RD		
Johnnie Dickson	74 perkintown Rd		
Jacob Leed	124 Deborah Drive Wyomissing, PA 19610		
JEFF LEED	2209 Quarry Drive, Ste. C-35, Reading PA 19609		
JAIME Dolbow	103 PennsGrove Auburn Rd.		
EW DORN	28 PENS - PED Rd		
Tom Becute	32 Pennsgrove - Ped Rd.		
Barbara Baber	191 PN-Ped Rd Pedricktown		Resident
George Bradford	27 Main St. Auburn		Township
EARL RANSOME	122 Auburn-PED RD PED.		Resident
JOHN Dawe	85 NEWROAD		

500490

Attachment D

Transcript of the July 7, 2011 Public Meeting

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2

- -x

NL INDUSTRIES SUPERFUND SITE

PUBLIC MEETING

- -x

Oldmans Township School
10 Freed Road
Pedricktown, New Jersey

July 7, 2011
6:30 p.m.

P R E S E N T:

NATALIE LONEY,
Community Involvement Coordinator

THERESA HWILKA,
Remedial Project Manager

KIM O'CONNELL,
Section Chief,
Southern New Jersey Remediation Section

MIKE SKORKA,
Hydrogeologist

MS. LONEY: We're going to get started now. I want to thank you all for coming out. My name is Natalie Loney. I'm the Community Involvement Coordinator with the Environmental Protection Agency. And with us this evening are three other EPA personnel.

That's Theresa Hwilka. She's the Remedial Project Manager on this site.

Next to her is Kim O'Connell. Kim O'Connell is her boss. She's the Chief of the South Jersey Superfund branch.

And next to her is Mike Skorka. Mike is a hydrogeologist assigned to the site.

The purpose of tonight's meeting is to go over the EPA's proposed plan to address contamination at the NL Industries Superfund site. This particular proposed plan is going to be looking at the groundwater component of contamination at the site.

And since this is a public meeting, EPA will be taking comments tonight for the record. And we have a stenographer here, who will be recording all of the comments, our presentation, and your questions.

So, the only thing that I ask is that at the end of the presentation, when you're ready to ask questions, just state your name for the record.

So, this is the agenda for this evening. We're going to do a brief overview of the Superfund process, we'll look at the site, talk about the history of the site, talk about the amendments to the Record of Decision, and the alternatives, which is the document that you have here, the proposed remedial alternative. And then we'll open up the floor for questions and answers.

This particular slide kind of will give you a roadmap as to how we came to this point in the history of the Superfund site. This is generally the process that takes place at any Superfund site.

We start off with the site discovery. In some Superfund sites where there's groundwater contamination, sometimes residents may notify the state or even the federal government. There's a whole host of ways that Superfund sites are brought to the attention of the federal government.

Once the site is discovered, so to speak, we go through a process of investigating the site and looking at our initial site assessment. And it goes through a process here called the NPL ranking or listing.

Before a Superfund site becomes a Superfund site, it actually goes through a process where there are a series of questions and analyses to determine whether or not the contamination at that site is egregious enough to warrant being placed on the Superfund list.

This site went through that process, and it was determined that it did qualify to be placed on the Superfund list, and then it became a Superfund site.

Once a site becomes a Superfund site, that opens it up so that Superfund or federal dollars can be used if a responsible party is not present at a site.

We've completed the NPL ranking and we went through a process called the Remedial Investigation and Feasibility Study. What that is is looking at the nature and extent of contamination at a Superfund site and what feasible options are available to address the contamination.

So, we've gone through the identification of the site, it was placed on the NPL or the Superfund list, and we looked at the nature and extent of contamination.

Once that is completed, it goes to the next step, where, after looking at the nature, the extent of the contamination, and feasible options for addressing it, EPA comes up with what we believe is the best alternative to remediate or clean up that site.

And that's why we're here tonight. We're presenting to you what we believe is the best remedy to address the contamination at the site.

As part of the Superfund process, we are required by law to have public comment, where there's a 30-day comment period after we've gone through a public meeting and expressed what we believe is the best remedy and take questions from the community.

You can either submit your comments tonight in the form of a question or a statement on the record or you may decide that you want to submit a comment later on. You can submit it via e-mail, via snail mail, and the address and e-mail address for Theresa is available at the end of the back of this proposed plan.

Now, the comment period for this particular remedy is July 21. So, if you want to comment tonight, you can do so, but you have until July 21 to submit comments to the Agency.

Once the comments are received and the comment period closes, EPA goes through a process where we review the comments, we respond to all of the comments that we receive, and that's put together in a document called a responsiveness summary. The document will be available to the public.

And that responsiveness summary is part of a larger document called a ROD, the Record of Decision. That Record of Decision basically is -- this is what EPA's final decision is as to what remedy will be implemented at the site.

So, we've gone through the process of listing, we've gone through the process of site analysis, and we're now in the portion where we're presenting our remedy and you're commenting on it.

Subsequent to that will be the Record of Decision. Once the Record of Decision is final, that's when we actually go into the actual design and implementation of the remedy.

I'm going to turn the floor over to Theresa. She'll take you through the site history, the proposed plan, et cetera, et cetera.

Remember, at the end of everything -- hopefully, you have pens or you have the proposed plan -- if there are any questions that stick out in your mind during the presentation, take a moment to jot them down so that at the end of the presentation you'll be able to ask your questions.

Thank you.

MS. HWILKA: Again, my name is Theresa Hwilka, and I'm the Remedial Project Manager for the site. If at any time you can't hear, please raise your hand and let me know.

I'm the project manager currently for the site. This figure right here is an overview of the NL Industries Superfund site. It's bordered by Pennsgrove-Pedricktown Road, Benjamin Green Road, U.S. Route 130.

(Pause in proceedings)

MS. HWILKA: So, it's about a 44-acre site and it's bisected by the active railway. Some site features include the closed landfill that's about 5.6 acres. As I just said, this landfill is closed.

It's currently being maintained by NL Industries, but it's not part of our Superfund site. This landfill was closed prior to the listing of the site. And it does have a leachate collection system and it is monitored by the State of New Jersey.

This is where the former NL facility was actually located. This is where the building and operations were located.

We also have the west stream, which actually continues beyond Route 130 and eventually discharges into the Delaware River. There's also the east stream on the other side.

As most of you know -- you might be residents of Benjamin Green Road -- there are private residential and a few commercial properties along Benjamin Green Road. And these residences are on public water supply, whereas those residences located along Route 130 utilize groundwater for drinking water.

The properties in the vicinity of this site are used for residential, commercial, agricultural, and military purposes.

In terms of site history, between 1972 and 1984, the site was used as a lead-acid battery recycling and secondary lead reclamation facility. Basically, what this means is there was a battery-crushing operation.

So, they crushed the batteries, the sulfuric acids that were in the batteries were drained, and then the remaining material was processed to recover the lead.

In these battery-crushing operations, the waste resulting from these operations were disposed of in a landfill on site, and the soil and sediment from surrounding the site was contaminated with metal, primarily lead. And the groundwater contamination consisted primarily of lead and cadmium with a few localized areas of volatile organic compounds.

So, in 1983, the site was placed on the National Priorities List. That's one of the steps that Natalie just referred to. And in 1986, NL Industries assumed responsibility for conducting the Remedial Investigation and the Feasibility Study, and the EPA did the oversight for that.

So, after we did the RI/FS, in 1989, EPA initiated the multibased cleanup activities. And this was done to address the most immediate public health concerns at the time.

These activities included things likes constructing security fences, encapsulating slag piles, demolition of the buildings, and removal of the most highly contaminated stream sediments.

After we did those initial actions, the remaining remedial efforts were split up into what we call operable units. So, we have Operable Unit 1 and Operable Unit 2.

Operable Unit 2 was actually

done first, and the EPA issued that Record of Decision for this operable unit in 1991. This covered addressing slag and the lead piles, contaminated surfaces and debris, and contaminated standing water and sediments.

Other activities under this operable unit included things like offsite reclamation of lead-containing materials, solidification and stabilization of the slag piles and offsite disposal of that, decontamination of the building floors and surfaces, and offsite disposal and treatment of the contaminated standing water and sediments.

Those are some examples of what was conducted under Operable Unit 2, and these activities were initiated in 1992 and completed in 1995.

This brings us to Operable Unit 1. And the ROD for this operable unit was issued in 1994, and it addressed soil, groundwater, and the stream sediment. So, there was a lot of media being covered in this operable unit.

Our objective for this unit was to leave no greater than five hundred parts per million of lead remaining in any site soils and stream sediment. And we also needed to restore the contaminated unconfined aquifer to drinking water standards.

In terms of remedy selected in this ROD, for the soil and sediment we selected excavation, and for the contaminated groundwater a pump and treatment system was originally selected as the remedy.

In 1999, we issued what's called an Explanation of Significant Differences. This document had a small change in the remedy for soil and sediment, whereby instead of excavating the material and disposing of it on site, we excavated the material and did offsite disposal.

I'll give you a little history of the soil and sediment portion of this operable unit. What we're here to discuss today is really the groundwater component, so I'll go over this rather quickly.

For OU1, the soil and sediments, we had remedial actions that were initiated in 2000 and completed in 2003. What we did here was we excavated the soil having greater than five hundred parts per million of lead because that was our remedial action objective.

These were the soils that were located in that former facility area because that's where all the buildings were and all the slag piles were and everything.

But we also removed some contaminated sediment having greater than five hundred parts per million along portions of the east stream, the west stream, and the channel north of Route 130 -- that's the Army Corps section -- and we disposed of the soil and sediment in an offsite disposal facility.

After we completed this remedial action, we continued to monitor the site to ensure that we didn't miss any soils that may have had lead over five hundred parts per million.

And we have recently looked at all the monitoring and looked at all the data, and we did find some additional areas in the west stream that had lead that are going to be addressed this summer, 2011, via excavation again.

So, I'm going to move into

the groundwater portion of this presentation. I just want to give you an overview of what we're talking about when we say "groundwater".

Normally, you have your land surface with your vegetation. You have rain and runoff that permeate this top layer of soil called the unsaturated zone.

The reason why it's called that is if you were to look in the soil and look between the pores -- it's hard to see in this light -- you have water-filled spaces and you also have spaces of air.

When you go beneath the water table, this is the saturated zone. What makes it saturated is there are no more air pockets. All but four feet from the soil are filled with water, and this water is what we refer to as groundwater.

On our site, the water table

is as shallow as five feet below the land surface in some areas. So, our saturated soil zone, the first layer, is what we call the unconfined aquifer. This unconfined aquifer is the top layer that's about twenty feet thick. This is where we're finding contamination at the site.

So, there's deeper groundwater in the other aquifer layers, but, again, our contamination is what we're finding in the unconfined aquifer portion.

With respect to groundwater, monitoring was conducted during the Remedial Investigation in 1988 and 1989. As I said, the site-related contaminants were found in the unconfined aquifer. The primary contaminants of concern were lead and cadmium. There were a few localized areas of volatile organic compounds as well.

As part of the remedial design process in the Superfund, we were looking at the pump and treat remedy because that was what was originally selected in 1994 in the ROD. And, so, when we got to the remedial design phase, we did two phases of groundwater evaluation.

So, the first groundwater evaluation was conducted in 1997. And, basically, what we determined was that with low groundwater pH, there are higher concentrations of the contaminants, the lead and cadmium.

Again, the low pH is a result of the battery-crushing operations and all the acids that were deposited on site. So, it lowered the pH below a natural range, which for this area would be a pH of five or six.

However, we also noted in the stage one investigation that the concentrations of the contaminants had decreased since the original sampling that was done in the RI.

So, we moved on to phase two, and that was conducted in 1998. And some of the main things that we grasped from this investigation was from the pump tests. So, again, we were evaluating the pump and treat remedy and working towards the design.

So, the pump test indicated that a constant pump rate -- constant pumping of contaminated groundwater was not highly efficient at removing the metals from the groundwater. And, again, we also saw a trend of continued decrease in the mass contaminants over time.

We removed the source material with all the excavation, and there are also natural processes at work helping to degrade the contaminants as well.

So, we did additional groundwater monitoring in 2004, 2007, and 2010, and, again, were continuing to see this decreasing trend of contaminants of concern.

The majority of this contamination is actually located beneath that corner facility area. So, that, again, is that area kind of near the landfill where the former facility was located in that southeast corner.

We've also noted that there hasn't been significant migration observed in these recent samplings.

So, this figure -- it's hard to see, I'm trying to use my pointer for you -- this is the historical extent of lead concentrations above the groundwater quality standards. The current standards for lead are five parts per million.

So, you see Pennsgrove-Pedricktown Road, Benjamin Green Road, and here's Route 130. And here's where the former facility was and this is, of course, the landfill.

So, back in 1983, our lead contamination was around within this purple line here. And then as you move on to 1988, it was this green line. So, you can see it's getting smaller and smaller; 1998, this yellow, and then 2007, 2010, this area of red and blue here and here.

And the mass of lead, when we calculate the mass of lead over time, it's decreased from about 220 pounds in 1983 to about 2.7 pounds in the groundwater in 2010.

This is a similar figure for cadmium, which is the other primary contaminant of concern in the groundwater. Again, the green is from 1988, which extends all the way down almost towards Pennsgrove-Pedricktown Road. And in 2007 to 2010, it's the red line here.

The mass of cadmium has decreased from about seventy pounds in 1988 to about five point nine in 2010.

In addition to sampling the groundwater at the site, as I said, the residents along Route 130 require the groundwater as a drinking water source. So, we have wells north of the landfill here where we monitor to make sure that the contaminants aren't migrating towards those residents. And then we also sampled the actual residential properties and sampled their groundwater.

The most recent sampling was in 2004, 2006, 2007, and 2010. What we found is that for the most part, most of the lead and cadmium concentration in those residential properties were either not detected at all, they were significantly below the groundwater treatment standards. For lead, again, five parts per billion; for cadmium, it's four parts per billion.

There was one instance where there was a minor detection over; however, we don't believe that one is site-related.

Back in the 1990s, we had done the initial human health risk assessment as part of that Superfund process. This risk assessment was based on the groundwater samples that were taken in 1989.

And what the risk assessment told us back then was there was unacceptable risk for potential future receptors, and this is due to exposure of groundwater if it was ingested.

So, when we started doing this investigation of the groundwater remedy, we also took another look, a recent look, at the risk assessment to see if that's still valid today.

And what we found was that it is because the potential exposure pathways for future land use, to use this water for drinking water, you'd be exposed to ingestion. So, that still poses a risk and remains applicable for the site today.

So, while we are seeing decreases, significant decreases in the contaminants over time, they're still at levels that are above those drinking water standards right now. So, therefore, we still need to take action to address that to ensure that there's no risk to the public or the environment.

So, again, 1994 ROD, that

initially selected pump and treat for the groundwater remedy. But, again, as we look over time, since the remedial investigation to the 2010 sampling, we've seen that significant decrease in the contaminants of concern. Again, the main contaminants here are primarily lead and cadmium.

Also, now that it's 2010, there are newer technologies that may be more efficient in addressing the current contamination in groundwater than the initial pump and treatment remedy that was selected in 1994.

As a result, we decided to look at other alternatives. Is there anything else we could do, aside from pump and treat, to address the contaminants of concern today in a more efficient and more expedited manner?

Our remedial action objectives for this project include to restore the contaminated unconfined aquifer so that it meets drinking water standards for all contaminants -- not just for lead and cadmium, but for any contaminants site-related -- to minimize any potential for migration; and, also, to prevent exposure for human health purposes and environment.

Again, I told you exposure would be ingestion for potential future use, like a residential use.

So, now we'll look at the Feasibility Study. We looked at four alternatives.

The first one is no action. That's required to be maintained in a Feasibility Study because it serves as a basis of comparison because no action means just what it says; no actions are taken to address groundwater. There are no institutional controls, which would restrict the use of contaminated groundwater until we reach our cleanup objectives, and this alternative provides no monitoring for contaminant concentrations.

Alternative two is called monitored natural attenuation, and that's coupled with institutional controls. Monitored natural attenuation relies on natural processes to clean up or attenuate pollution in groundwater.

These are three examples of what these processes are. You can have biochemical reactions, and that's basically within the soil and groundwater.

You have microbes that can use the chemical as a food source. And by using it as a food source, it alters the chemical and reduces it to harmless water and gas or less toxic water.

Also, in nature you can have adsorption, where the groundwater is mixed in with the soil, the saturated soil. So, you can have an instance where the chemical adsorbs directly to the soil. It's basically sticking to the soil, so it's still in the aquifer but it's removed from the groundwater. The groundwater is flowing through, the chemical is adsorbed, and the actual groundwater coming out has lower concentration.

The last one is dilution. So, over time, as clean groundwater from other areas are flowing through the site, you're essentially diluting the chemicals there and reducing the concentration.

Alternative three is reagent injection -- let me step back.

Monitored natural attenuation, these are the processes, but this alternative will also include monitoring over time to make sure that that's working and we're seeing decreases in contaminant concentrations. And it also includes institutional controls, again, to restrict the use of the groundwater until that contaminated groundwater is clean.

So, alternative three is reagent injection. This involves injection of reagent into the unconfined aquifer into the injection wells. And what this does is it facilitates adsorption gases.

So, with this method, we have direct adsorption, where the chemicals just adsorb directly to the soil. But what this alternative does is it's a more complex reaction.

So, if you picture these green circles as being, for example, cadmium, it's bound within a crystal lattice of another structure. It fosters this development of this molecule, and then that whole structure adsorbs into the aquifer soil.

So, it's a little more complex reaction that's more tightly binding your contaminants within another structure first. And then when it adsorbs to the aquifer soil, you're again removing the contaminants from the groundwater and, thereby, since it's also a more complex reaction and more tightly bound, it's less susceptible to other changes, you know, chemical changes in the groundwater that can occur over time.

And, again, this alternative would also include monitoring over time so we can see our progress and achieve our cleanup goals, as well as the institutional controls.

The fourth one is pump and treat, which was, of course, retained in the feasibility study since it was the originally selected remedy. The pump and treat would involve the construction of a groundwater treatment plant that would be put on the site and it would pump the groundwater up.

Initially, in the initial ROD, it was estimated at a 250 gallons per minute pump rate. So, the water would be pumped up and then go through reactions such as precipitation/flocculation and a polishing step to remove the contaminants, and then that treated water would be discharged to the Delaware River, which is about one point five miles away.

And, again, this target of the clean water meets the drinking water standard. And, again, pump and treat also includes monitoring and implementation of institutional controls.

Now let's look at the cost of the remedy and how long it's going to take to reach our cleanup objective.

Obviously, alternative one wouldn't cost any money because we wouldn't be doing anything. And there's no way to really tell or monitor when we'd reach a cleanup goal with no action.

For M&A, it would be about $1.2 million and it would take roughly greater than fifty years to let those natural processes work and meet our cleanup objectives.

For reagent injection, it's comparable to M&A, about $1.6 million. However, the key here is the time frame. It will take less than ten years to achieve our cleanup standards.

With pump and treat, this is

actually the most expensive, roughly $5.7 million, and it would, again, take more than fifty years to reach our cleanup objectives.

So, when we evaluate all these alternatives, we look at nine criteria. We look at protection of human health and the environment, compliance with state and federal regulations, the balancing criteria, long-term effectiveness and permanence -- is this going to work and last -- reduction of toxicity, mobility and volume, short-term effectiveness, implementability, and cost.

And then we also look at modifying criteria, which are support agency concerns as well as community concerns, which is partly why we're here today to get your comments and feedback.

So, after you evaluate the

alternatives against those nine criteria, we feel that alternative three, the reagent injection, is the preferred alternative at this time.

This includes pH adjustment, and the reagent injection fosters that adsorption reaction, the monitoring, and the implementation of the institutional controls.

Again, this alternative, we feel, provides the best balance of those nine criteria. It's able to reduce the toxicity, mobility, and volume of contaminants in the shortest time frame and has the greatest degree of long-term effectiveness and permanence, and it's also cost effective.

With that, I can open it to questions and comments.

And, again, here is all of our contact information. If you want to submit your comments, you can do so via e-mail. Or I guess you could send your comments to me as well at 290 Broadway by July 21.

And this is the website that has additional site documents, all the history of the site, the ROD, and other documents to learn more about NL Industries Superfund site.

MR. KYLE: Can we ask questions now?

MS. HWILKA: Yes.

MR. KYLE: My name is Lester Kyle. I am a previous haz mat worker. I've worked on Superfund jobs before.

Is this still a Superfund job?

MS. HWILKA: Yes.

MR. KYLE: What is cost effective is getting rid of the dump.

MS. HWILKA: The landfill here you're referring to on the site?

MR. KYLE: Yes.

MS. HWILKA: That's not part of our site.

MR. KYLE: That's your main problem.

MS. HWILKA: Well, the site has a leachate collection, so any contaminants that were enclosed -- the landfill is capped, and then anything that runs through, contaminants are collected in the leachate system and disposed of offsite.

That's maintained by NL Industries. And, also, they have to report to the New Jersey Department of Environmental Protection.

MR. KYLE: Can I tell you what I know about that dump?

The job that I worked is eight miles up the road, the Rose project in Bridgeport. The outfit that started the cleanup job on National Lead hired the firm that was working on our job at the time. They come down there and they did a study of the fourteen monitoring wells around that dump.

MS. HWILKA: Around this dump?

MR. KYLE: Yes.

I've never been on that site in my life, and I know about it from the guys that did it.

Five of them were boiling at the time.

Now, who knows about that besides them and me?

MS. HWILKA: Well, now, currently, we have wells all around. There's wells all around this area --

MR. KYLE: At that time, there was fourteen.

I even come to a meeting, a public meeting we had right here, and brought it up at the time. I wasted my time because the guy that was here in the audience from

National Lead didn't know nothing about the study or the sampling that was taken by the two guys that was on our job that did it.

MS. HWILKA: What I can tell you about the current state is we have 28 monitoring wells, currently.

MR. KYLE: Why is that?

Because you made that dump bigger.

MS. HWILKA: Well, we put the wells in to determine the nature and extent of the groundwater --

MR. KYLE: Tell the truth now.

Originally, that dump was five acres. And you made it bigger. You added to it.

MS. HWILKA: When it was listed as --

MR. KYLE: Am I right or wrong?

MS. O'CONNELL: You're not

correct.

MR. KYLE: I'm not?

MS. O'CONNELL: The landfill was created by NL when they were operating.

MR. KYLE: But when they had the public hearing here, it was brought up at the meeting that they was going to add to that landfill. That was one reason I come to it.

MS. HWILKA: Sir, do you know the year that you're talking about?

Because we had that explanation --

MR. KYLE: Well, whichever public hearing you had right here. National Lead representative was here.

MS. O'CONNELL: We had one in 1994, before we issued --

MR. KYLE: That was probably it.

MS. O'CONNELL: That may

have been it.

This work is being done by a group of responsible parties, including NL, under EPA's authority, being paid for and performed by responsible parties that include NL and other entities.

That landfill was closed prior to it becoming a Superfund site. It was closed under State authority and is currently, by NL --

MR. KYLE: I already know all that.

MS. O'CONNELL: And they manage it and they report to the State and the State is in charge of that closed landfill. And they do monitor the leachate, we know that.

But our Superfund site, what we're looking at, when this site came on the NPL, the immediate problem was extensive abandoned hazardous waste. There were slag piles all over the place, severely contaminated soils, severely contaminated sediment in the stream, waste everywhere, and buildings that were crumbling, a physical hazard --

MR. KYLE: We all know that. We live here.

MS. O'CONNELL: What we did when we studied the site, we had studied all the contamination, we took an immediate action to take care of the exposed waste which was an immediate risk. Then, after the buildings were gone and the slag piles were gone, we sampled all the soils, the sediment.

And we have 28 wells in our network. That does not include any leachate monitoring that is done by NL.

MR. KYLE: You mean 28 wells on this site?

MS. O'CONNELL: All on this site.

MR. KYLE: What about around the dump?

There was fourteen.

Is there still fourteen?

MS. O'CONNELL: There's not fourteen.

We have 28 wells that we've been monitoring over time and we're looking at trends --

MR. KYLE: These two gentlemen came down here and took samples from fourteen wells around that dump.

And that particular night, we went up to the wall where there was a big map hanging and we counted them.

MS. O'CONNELL: You're saying in 1994, there was data presented to you --

MR. KYLE: If that's the year.

MS. O'CONNELL: There was

groundwater contamination, there still is, in the vicinity of the landfill.

MR. KYLE: It's from the dump.

MS. O'CONNELL: Show them the groundwater flow direction.

The groundwater flows towards the Delaware River.

MR. KYLE: At that time, there was five of them that were hot. Boiling, he said.

Are they still boiling?

MS. O'CONNELL: We're looking at drinking water standard for lead of is five parts per million, and drinking water standard for cadmium is four parts per million. There are a number of wells that are significantly above that, and there's going to be a cleanup action.

But what Theresa was showing you is there's a trend. We've been sampling since the eighties a number of wells all around the site, and the trend we're seeing is the pH -- which is how acidic the groundwater is -- was brought down very low, very, very low pH because it's very acidic from the operations at the site. And that was allowing the lead --

MR. KYLE: I don't have to hear any more of that.

If this is still a Superfund cleanup job, why don't they get rid of the dump?

As long as that dump is there, you're still going to have contamination as long as it's there.

MS. O'CONNELL: The dump is contained and the leachate is collected. So, that means that --

MR. KYLE: You think it's in that one spot all the time?

MS. O'CONNELL: It's capped, and any contamination that's running off is collected.

MR. KYLE: How often do they pump those wells?

MS. O'CONNELL: This is under State authority. We can get more details on that.

MR. KYLE: How often are they testing?

How many of these residents know that?

MS. O'CONNELL: This is not part of the Superfund action.

We're dealing with the groundwater contamination that originated at the facility, was flowing towards the landfill and is still present there, although the area of contamination has decreased over time because of natural processes. There's still significantly elevated contamination --

MR. KYLE: So, this meeting don't have anything to do with the dump itself, just surface water?

MS. HWILKA: The

groundwater.

If what you're saying is you think that something is leaching beneath the landfill into the groundwater --

MR. KYLE: We know it is.

MS. HWILKA: Well, what Kim is saying is anything coming from beneath the landfill is collected, put in a tank, and then they pump it out --

MR. KYLE: What about all the water underneath the landfill that's going down into the aquifer?

MS. HWILKA: All of these pink dots are all of our well network for the whole Superfund site. So, we monitor these, and that's how we delineated our plume.

So, the area that we're treating includes the groundwater beneath the landfill.

MR. KYLE: And you think

it's stopping right there, it's not going on down?

MS. HWILKA: I'm not sure I understand.

MR. KYLE: The point I'm trying to get across to you people is as long as that landfill is there, you're gonna have this problem I don't care what you do here.

I've worked in this work for years. Not just up here, I've worked over in a big dump, 68 acres, for a while, and you have nothing but problems.

You got to get rid of that dump.

MS. O'CONNELL: I guess your comment is that that dump, the landfill, is continuing to act as a source --

MR. KYLE: Yes, and always will.

MS. O'CONNELL: But we're seeing something different than that.

The landfill leachate -- what's contaminated in the landfill is collected. It's not allowed to go into the groundwater, it's collected.

So, we don't see that as a primary source. If it became a source, we would see it by our long-term groundwater monitoring. You'd start to see the levels going up. The levels around the landfill --

MS. HWILKA: Are going down.

MS. O'CONNELL: -- the levels of contamination in the groundwater are going down.

MR. KYLE: I have one more question.

When this project was going on, they tore down the buildings, got rid of the slag piles and the conveyors, and this and that. I remember in the paper it said stage two of this cleanup job was to take eighteen inches of soil off the 44-acre site to get rid of all contamination and then test the soil. And if there was still a radius of contamination, they would take more.

I've lived here for 21 years in this township, and I've never seen that done.

MS. HWILKA: Well, the soil went with operable unit two, I assume is probably what you're referring to. They did excavate the area.

Let me go back to the map.

MR. KYLE: They only excavated where the buildings were.

MS. HWILKA: Hold on one second. Let me go back.

MR. KYLE: I'm bringing this up for the residents. I live a mile from here. It don't bother me.

MS. HWILKA: So, they

excavated soil. This is where the gross contamination was.

MR. KYLE: You're pointing around the whole 44 acres?

MS. HWILKA: This is the former facility area where the contamination was found. They also removed sections of the east stream and the west stream.

MR. KYLE: That was afterwards.

MS. HWILKA: Right, but that was part of the next phase.

MR. KYLE: That was because the residents in that area had bad water.

MS. HWILKA: So, during the Remedial Investigation, we don't just sample right here, we sample further out until we get to areas where we don't find contamination, and that's how you determine the extent.

Then what they did was they found that the area that had the contamination above five hundred parts per million of lead was in this area here as well as part of this stream and here. And those were excavated.

MR. KYLE: When is Superfund going to finish this project?

MS. HWILKA: That's what we're trying to do with the groundwater.

After the operable units are done -- like operable unit two, after they excavated, they do have to do confirmatory samples. So, that's when they go back and --

MR. KYLE: Going to take the dump out?

MS. HWILKA: No.

They went back and they did confirmatory samples and --

MR. KYLE: You people are wasting your time until you get rid of that dump. It's a fact.

MS. HWILKA: Well, we've noted that.

MR. KYLE: Okay.

MS. DOLBOW: I have a question. I'm Jaime Dolbow.

You're talking about -- say that's your hot spot.

I want to know, how far out a radius have you tested the wells?

MS. HWILKA: For the groundwater?

MS. DOLBOW: You're talking about right now -- like, say that's your hot spot right now.

How far out in a radius have you tested well water in general?

MS. HWILKA: Well water, let me go back to that figure a second.

This is our current well network, but what we did is --

MS. DOLBOW: I mean off the site.

MS. HWILKA: Right.

So, what we did was we delineated the plume. So, we go out until we hit a clean zone. So, if you remember -- let me go back just as an example.

We have wells up here and you know there are wells that were monitored. So, this is where we determined the extent of the contamination. Beyond that, clean groundwater was found.

So, that's how we -- we go out until we hit clean groundwater that meets the drinking water standards.

MS. DOLBOW: How often is that tested?

Because your aqueduct can change flow at any point in time.

MS. HWILKA: Right.

Groundwater flow is very slow, and we've been monitoring these over time. I just showed you the most recent data was 2004, 2007, 2010.

And that's where we're seeing the contamination, only in this general vicinity. But we monitor all these wells when we go out and sample.

And as part of this groundwater remedy, we would start off with either twice-a-year monitoring or once-a-year monitoring to get our data. But right now, what we're seeing is contamination only in these areas.

These wells up here, you know, have now met -- you know, the contamination has decreased to the point where they're meeting drinking water standards. That's why the residents along Route 130 -- that's why we have the wells here, to ensure that these remain clean.

And that's why we also couple it with --

MS. DOLBOW: What about going the other way?

You keep mentioning going towards 130.

What about residents on the other side?

MS. HWILKA: Towards Benjamin Green Road?

MS. DOLBOW: In general.

MS. HWILKA: Well, in general -- again, this is the area we have exceedances above the drinking water standards. So, these wells are outside now in the sort of clean zone. So, we know that the plume is only here. It's not spread beyond these wells because these wells are clean.

And, also, it's important to note that groundwater flows towards the west stream. It flows in a westerly direction. And that makes sense when you see, you know, these wells, the residential wells have been sampled and have not had, you know, concentrations above the drinking water standard, because, again, this unconfined aquifer -- groundwater flows -- I don't know the flow rate right offhand, but it flows very slowly and it flows towards the west.

So, if you had contamination, it's not going to be flowing really radially out. It flows in the general direction towards the west stream.

But, basically, again, we test wells further out until we hit a clean zone. Once we hit the clean zone perimeter, we know that --

MS. DOLBOW: Is that just on the property you're testing or you're you going out to, like, Pennsgrove --

MS. HWILKA: No, we've only gone out to here because that's where we found the clean area. So, we know that the groundwater contamination is within this area.

If these wells were above the drinking water standards, we would have to put more wells and we would have to keep going out until we hit a clean zone.

MS. DOLBOW: Okay.

MS. HWILKA: So, that's how we go about what we call delineating our plume.

MS. DOLBOW: I also have a question about alternative three you talked about.

You're putting another chemical agent or something into the water to collect the contaminants to bind them.

Right?

MS. HWILKA: The reagent that would go in is not a toxic reagent.

MS. DOLBOW: Right.

MS. HWILKA: So, it would then go in and it would bind with the metal --

MS. DOLBOW: And it settles to the soil.

MS. HWILKA: Yes, it would adhere to the soil.

MS. DOLBOW: Are you going to clean it out or are you going to leave it?

MS. HWILKA: No, it stays in place because what it does is it binds the soil. So, it's still in the aquifer, but it's no longer in the groundwater flow.

And in order for it to desorb or something to that effect, you'd have to have really, really low pH, like a pH of one or two, and that's not what we're going to be seeing here because already the pH is rising because we've removed the source material and clean groundwater is flowing in.

So, the pH over time has gone from, you know, a pH of two, three, and now it's coming up more towards four, towards five. So, even at this current pH, you shouldn't see desorption of these metals.

MS. DOLBOW: In how many other areas or cases has this alternative three been used and been successful?

Is there any kind of study on that?

MS. HWILKA: Other sites have used reagent injection.

Do you know any offhand I can reference?

MR. SKORKA: I don't know specific offhand.

MS. HWILKA: But there are studies. It's a proven technology.

MS. DOLBOW: It is proven that it isn't going to cause any further damage to the environment or to us around here?

MS. HWILKA: Right, because we're not putting another toxic substance in. We're putting it in to remove the contaminants. And the amount --

MR. KYLE: Would you drink a

glass of that stuff?

MS. HWILKA: Not right now because it's not meeting the drinking water standard, but after I would drink it.

MR. KYLE: When they put that in the ground, would you drink a glass of that?

MS. HWILKA: Yes, because once you inject the reagent, it's removing the contaminants. And we monitor it. And once we see that it's met the drinking water standards -- it's not happening overnight. It's going to take about ten years. You're cleaning gallons and gallons of groundwater.

So, once you reach that level where we monitor and see that it's now met the drinking water standards, then it's clean.

But right now, no one can use any water from these wells. It's going to be restricted because it's not safe to drink.

MS. DOLBOW: Is that stuff ever going to break down or remix with the water?

How long of a shelf life is that going to last?

MS. HWILKA: The reagent itself isn't what we're talking about. What we're talking is the adsorption, is that going to last, because that's what we want to know, is the contamination going to remain enforce?

So, that's what we're saying is once it does adsorb the surface of the soil, it's rather permanent because it would take a very low pH to desorb it. It would take all these extreme conditions that created the problem to begin with, with all this acid and low pH. That's what causes metals to go into solution. But in a normal pH level, anything that's adsorbed should remain adsorbed.

And that's why we monitor. We're not just going to all of a sudden say oh, we have one clean and now we're going to --

MS. DOLBOW: How long is the monitoring stage?

MS. HWILKA: So, it will be monitored until we get to those cleanup standards.

MS. DOLBOW: Say ten years from now, you have it all under control, drinking water standards have been met.

How long after ten years is that going to be monitored?

Or are you just going to walk away from it?

MS. O'CONNELL: Two points.

After the remedy is selected, if the reagent injection is the alternative that's selected, we will use our enforcement tools to get the private parties to do the work under our oversight. There will be a consent decree, negotiations, a legal agreement.

And as part of the agreement, they're going to be required to do a treatability study. So, that means that they would be going into a small area and they would be actually doing this initially and collecting a lot of data before it's done sitewide to make sure that all the details -- that it's working and all of the details are correct and we have the correct reagent.

And, you know, the point is to find out how much to put in and how close to inject it so it's effective. So, a lot of details of the engineering design of how it will be done will be developed during an engineering design phase.

And always with groundwater remedies, whenever we meet our goal, there's a number of years --

generally it's three to ten years -- after all standards have been met before we walk, before we are satisfied.

And monitoring will be going on at some frequency -- I'm not sure what frequency -- for at least five to ten years after standards have been met and possibly more, if necessary, on that site, but generally never less than that.

So, there will be a number of years of sampling after the standard is met to determine that it's been met for a number of years and that it's stable.

MS. DOLBOW: During this time in the cleanup, you'll be continuing to test wells during those monitoring stages and test all the monitoring wells on the property?

MS. O'CONNELL: This alternative would require extensive sampling throughout. You sample before you start reagent injection, you sample during, and you sample after.

And you do a trend analysis. And what you expect to see is where you injected first in that vicinity high, you expect to see it go down over time. So, there will be extensive groundwater sampling before, during, and after the remedy.

MS. HWILKA: It's not just the wells from that tiny little hot spot. We still monitor all the wells.

MS. O'CONNELL: And additional wells may be added. We'll make sure that there's no area that we want to monitor that's not covered. We can add additional wells if necessary.

MS. DOLBOW: Thank you.

MR. MILLER: Will Miller.

I spoke with you earlier

about this. The Army Corps of Engineers about a year ago put in approximately eight monitoring wells because they found lead on their property, which is -- that leads off of that west stream going down through on the other side of Route 130.

I'm wondering, has EPA been in contact with the Army Corps?

Have you gotten the sample results?

MS. HWILKA: Yes.

MR. MILLER: Have they been determined to be from this site or from dredge materials?

MS. HWILKA: Well, there's two things going on.

And Mike, you might want to address this.

There's the groundwater monitoring wells that they put in and that groundwater monitoring report. Initially, they wanted to make sure that our plume wasn't coming beyond Benjamin Green Road, and they put a few other wells in.

And I can follow up with you on this, but from our initial look at the data, they weren't finding what they thought they would. They were finding levels below the drinking water standards in the groundwater wells.

And then they also were sampling north of Route 130 in the sediment. So, not wells, but they took a few sediment samples. And they said they found some additional lead. So, that's something that we need to go and we need to coordinate with them and look at their data for the sediment portion.

But that's in their drainage channel. So, we need to look at that.

MR. MILLER: It's only common sense that if you have a source, you would expect to see the lead decreasing as you go out from that source.

Is it possible that you could get pockets of lead that transmitted outside of that -- your boundary there, your 13, 14, 15, 16, 17 wells outside of that, before you started monitoring?

MS. HWILKA: These were the wells that ended up in the network, but during the Remedial Investigation there were additional samples taken beyond this. I don't know offhand where -- oh, sorry, that was sediment.

But for here, no, we don't believe that there's another pocket. The Corps did put additional wells in, but they're not finding the levels of contamination that we have on our site.

MR. MILLER: I know they're pointing here.

MS. HWILKA: Yes.

We are in contact with the Army Corps.

MS. O'CONNELL: See those three wells? Those three wells are cleaned. And then we've sampled I don't know how many, six or seven or eight wells along Route 130, private wells, private residential wells.

So, those depths might vary, but those wells have never been impacted by the site. So, the site contamination, you know, has never gone beyond that, so we don't believe that -- if there's lead contaminants, we don't believe it's circulated.

But we're planning to sit down and go over all the Corps data with them.

MR. MILLER: Okay.

MS. O'CONNELL: The sediment might be a different story because the sediment contamination did move in the stream.

MR. MILLER: This stream runs all the way to 130, right.

MS. O'CONNELL: And if they're finding some additional lead, we'll be looking at that and meeting with them on that.

But we don't believe that the lead in the groundwater, lead contamination in the groundwater is -- right now, it's all contained on site.

And, also, I think Theresa made this point. The trend we're seeing is it's contracting. The plume is actually getting smaller over time through natural processes. And, so, that will be augmented if we implement the reagent injection alternative.

MR. DANSOME: I have a question. My name is Earl Dansome. I'm a resident.

In the nineties, there was a determination made and it was implemented. So, I guess my concern is that now we're 27 years later and we're still on the same page as far as trying to determine what to do.

I'm concerned, is there a problem that -- and then the communication has been that things are getting better, but, you know, all of a sudden there's an issue here.

MS. HWILKA: What we're finding out is -- so, we selected a remedy in 1994 for the soil, the sediment, as well as the groundwater. So, we dealt with the immediate public health concerns first, which were the soil and the sediment and direct exposure from the smelting operation.

So, while we were taking care of that portion, we did select pump and treat as a remedy, but we hadn't yet implemented it, but we were monitoring the groundwater. While we were taking care of all the soil and sediment portion of the site, we were monitoring the groundwater.

So, we only relatively recently completed all of that soil and sediment activity. So, now we're focusing back on the groundwater. And because we have this dataset now from, you know, the late eighties to 2010 on the groundwater and we're seeing this decreasing trend, significantly decreased concentrations, you know pump and treat may not be the way to go.

It's going to take more than fifty years to reach the cleanup standard. You have to construct a treatment plant, so that's added construction cost and time. And now there are other technologies, such as this reagent injection, that can more efficiently, effectively, address the amount of contamination that we have now.

So, that's what we evaluated. It's not so much that there was a problem with the remedy, it's just that at this point, now that we have all this other data, we don't really feel we need to go through this whole treatment plant construction and fifty years' worth of treatment when there's another technology available that's just as effective, if not more effective, and takes less time and less money.

So, that's why we're here today, to say: Well, let's think about it and see if we can implement a remedy using this newer technology with less cost, less time, same effectiveness.

MR. DANSOME: Federal taxes are what is used to fund this?

MS. HWILKA: No.

As Kim stated, the responsible parties for the site -- not the Government, those who were involved with NL Industries -- they're the ones that are paying for the cleanup and they're performing the work.

And as a federal agency, what our job is is oversight of the activities. So, any work plans that are developed are reviewed by EPA. All the designs are reviewed by EPA as well as New Jersey Department of Environmental Protection.

So, the PRP group has to meet these state and federal cleanup standards. So, they have to meet our standards, but it is being paid for by the PRP group, not EPA.

MR. DANSOME: One final question. Mortality rate.

Has there been any study or anything with regards to this general area here or this region or South Jersey with regard to mortality rate?

MS. HWILKA: I don't know in general mortality rate.

We did our risk assessment based on site-related contaminants to evaluate.

MS. O'CONNELL: The ATSDR, New Jersey Department of Health, usually looks at that type of thing, health effects in large areas which may have a number of different impacts. So, I'm not aware that they have looked at that.

What we look at is current and future risks posed by contamination at just this site. So, right now the risks that we're concerned about is the future -- right now, nobody's drinking the groundwater that's contaminated from the site, but there is potential for someone to drink that in the future, someone to become exposed to this contaminated groundwater in the future.

So, that's what's driving our cleanup. Again, there's not a current risk.

MR. DANSOME: You say future.

Isn't this the future?

This is 27 years out.

MS. HWILKA: In terms of what Kim is saying is because right now no one is drinking the contaminated groundwater.

So, we have to clean this up. This is in a class two aquifer for New Jersey, so that means it's supposed to be for potable drinking water use. So, because this area is contaminated, no one's allowed to drink water from this section.

So, what we're saying is we need to clean it up to restore it to drinking water standards so if in the future someone wants to use well water from this area, they'd be able to because it's been cleaned.

So, right now, no one's being directly exposed to it, so that's what Kim's referring to as future use. If someone were to come in and develop the site -- I think it's zoned commercial right now, but say in the future it became residential and they were on well water, this water has to be cleaned before anyone can drink it; otherwise, if it's contaminated, they have an unacceptable risk.

So, that's why we continue to monitor the site as well as the residences, to make sure that that contamination isn't flowing into someone who's using it as drinking water.

MR. KYLE: I have one more

question.

From the original demolition work and stage two cleanup -- and I'll mention this again -- they were supposed to take eighteen inches of material off that whole site and test it then.

And if they would have done that, if they would have done that and replaced it with clean soil, eighteen inches of new clean soil, would we be here today?

MS. O'CONNELL: Do you have the volumes?

MS. HWILKA: Yes.

MS. O'CONNELL: We didn't select --

MR. KYLE: Where is the contaminated groundwater coming from?

MS. O'CONNELL: It's coming from the former source that's all been removed.

We did not select -- we don't select a remedy that says remove eighteen inches --

MR. KYLE: That's what was in stage two in the paper.

MS. O'CONNELL: We selected a cleanup number. The cleanup number for lead in soil is five hundred parts per million. We determined that anything that's greater than that needs to be removed from site as a potential risk if you get exposed to it or to groundwater.

MR. KYLE: Those slag piles was 250, 225 parts per million and you took that out.

MS. O'CONNELL: They were all removed from the site --

MR. KYLE: All removed.

MS. O'CONNELL: All the soils above the cleanup standards for this site, 500 parts per million of lead, all of it, regardless of whether it was at 18, 24, 6, wherever it was, it was removed from the site. It was excavated --

MR. KYLE: The whole site was done?

MS. O'CONNELL: Yes.

MR. KYLE: And then replaced?

MS. O'CONNELL: There's no more source material.

MR. KYLE: It's been replaced with new soil?

MS. O'CONNELL: Yes.

MR. KYLE: Why are we having a problem?

MS. HWILKA: Because initially, when that slag material was sitting there, as you're saying, it doesn't just stay there at the time. For all the years when this facility was operating, metals and contaminants leached through the soil --

MR. KYLE: How far down do you think it went?

MS. HWILKA: Well, we know it went to groundwater. That's the unconfined aquifer that's --

MR. KYLE: Oh, now, stage two said they was supposed to take eighteen inches off the soil, and if it was still high, take more off.

MS. HWILKA: Which they did.

But this leaching process had already occurred. So, the contaminants that had been sitting there from 1972 --

MR. KYLE: So, they put all new back in?

MS. HWILKA: The site was regraded with new soil.

MR. KYLE: With all new soil.

If they took thirty inches off, they put thirty inches back?

MS. O'CONNELL: Yes.

MR. KYLE: And we still have problems.

MS. HWILKA: Because that was there before.

MS. O'CONNELL: When the

source was sitting there -- the facility operated for years. The source was sitting there. And while the facility was operating, contamination was placed on the ground uncontrolled and it migrated down to the soil --

MR. KYLE: You're saying the contamination is coming back up.

MS. O'CONNELL: No, I'm not saying that.

MR. KYLE: Well, it's what you're saying.

MR. SKORKA: Part of the contamination had the acid from the batteries. So, the acid dropped the pH levels down to two or two and a half. That is when lead and other metals can be mobilized more easily, at the lower pH.

MR. KYLE: But all that was supposed to be taken out.

MR. SKORKA: We didn't remove groundwater soils. We only removed the dry soils. So, in the groundwater, you still have these low pHs.

MR. KYLE: Every time the water table comes up, so do the contaminants.

MR. SKORKA: Well, the contamination is there. We still have low pH.

So, one of the things we think of being done is we would add a chemical to raise the pH to more of a neutral level. That will, hopefully, facilitate the adsorption.

MR. KYLE: What do these farmers around here do when you put all the chemicals in the ground?

When they grow stuff, there's not supposed to be any chemicals in the water that they're pumping out of the ground. It goes to these vegetables.

I'm surrounded by water.

MS. HWILKA: But this is only on treating the water in the unconfined aquifer on the site.

MR. KYLE: That water's running down the aquifer.

MS. HWILKA: And it's reacting. So, once it's --

MR. KYLE: People's wells are pumping it back up.

MS. HWILKA: People's wells are not pumping from this site right now.

MR. KYLE: Okay.

MS. HWILKA: So, what we do is we add these chemicals that raise the pH. And once your chemicals are reacting, they're reacting. They're not just free flowing.

That's why we also do monitoring and why we have a treatability study, so that we can determine the right concentrations to add just enough that are going to react with all of our contaminants to remove the contaminants.

And then there'd be --

MR. KYLE: Again, will you drink a glass of that?

MS. HWILKA: Once it meets drinking water standards, I would drink a glass of that.

That's why no one is allowed to drink this water right now, because it doesn't meet the standards. And that's why we're here today, is because we want to clean it up so that it can be restored because those are the regulations and so no one would be directly exposed to contaminated drinking water for future use.

MR. KYLE: Are you the representative for NL?

MR. SKORKA: No, I'm with the EPA, hydrogeologist.

MR. KYLE: Don't you work for the State?

UNKNOWN SPEAKER: Are the

wells screened at different levels?

MR. SKORKA: EPA.

MS. O'CONNELL: We're federal, EPA.

MS. HWILKA: Yes, the wells are screened at different levels.

That's, again, when we did our delineation, that's how we determined it was in the unconfined aquifer. And then we do have wells screened at different portions of the aquifer to ensure that that whole area is clean.

MS. DOLBOW: Even in your outer perimeters, you have deep and shallow?

MS. HWILKA: Yes, we have shallow and deep. That's why there are wells that are coupled together; they're screened at different levels all around the site.

MR. NIPE: Ron Nipe.

When you started the process, how deep did you put your bores?

How deep is the contamination?

MS. HWILKA: For the sediment and soil, I don't know offhand initially from the RI, but we can --

MS. O'CONNELL: The water table was sometimes at five feet. We went down to eight feet --

MR. NIPE: The water's in the soil.

MS. O'CONNELL: Right.

MR. NIPE: How deep did you do your bore before you ran into contamination?

MS. O'CONNELL: When we decided we would remove the soil, you mean?

MR. NIPE: Yeah.

MS. O'CONNELL: We went down to the water table as necessary. We stopped at the water table because then that's a groundwater issue here.

So, we went down fairly shallow. It was fairly shallow, maybe five to ten feet, depending on where you were at the site. But we didn't necessarily even go down to the water table if it was clean. We went down until it was clean or we hit water.

And we removed all the unsaturated soils that were above five hundred parts per million.

MS. HWILKA: And then the groundwater monitoring wells go deeper, and the groundwater remedy is what we're looking at here. That's what this comment --

MR. NIPE: How deep in the soil, how deep in this underground does the contamination go?

MS. HWILKA: Right now, we have contamination in the unconfined aquifer that's about twenty feet in thickness.

MR. NIPE: So, you have contamination twenty feet deep.

MS. HWILKA: In the groundwater --

MR. NIPE: In the groundwater.

MS. HWILKA: -- that we're addressing --

MR. NIPE: The aquifers in this part of country come from the Pocono mountains and runs to the ocean.

MS. HWILKA: Right.

And the contamination that we're seeing is isolated to the area beneath the former facility. That's why we have that extensive well network and we sampled radially out and saw that we eventually reach a point of clean groundwater, again, screened at different depths so we know we've reached a clean zone. And that's how we knew that the contamination was confined to the area around where the former facility is.

So, we did look at different depths, we've determined that the contamination is within the unconfined aquifer that's roughly twenty feet thick, and we have a well network of 28 wells screened at different depths, and we determined how far out the contamination went.

As we said, over time the contamination plume has shrunk and we really only seen contamination, again, in the area by the former facility.

So, while I understand what you're saying, groundwater does flow through and it flows through towards the Delaware River eventually, but our contamination is only localized to this one area, and that's the area that we're cleaning.

And, again, groundwater doesn't flow at a rapid pace. And as it sits there, natural processes have already been working to reduce the contaminants through natural processes, that adsorption process.

MR. MILLER: Bill Miller.

I assume you're going to inject, like, a base material to counteract with the acid.

When would you expect to see the levels start to drop.

A year? Two years? Six months?

MS. HWILKA: You mean the pH levels?

MR. MILLER: The pH.

MS. HWILKA: Well, we're going to be doing a treatability study --

MR. MILLER: Actually, pH rise.

MS. HWILKA: Yeah.

We're going to be doing a treatability study first, so that's when we're going to determine -- you know, it's already acidic. So, by adding the base, that's what is reacting, and it will neutralize the groundwater.

So, in terms of how long it takes, that part would be part of our treatability study. And our remedial design is to determine what's our volume of contamination, and we know the pH, and then we would calculate how much base we need to add to neutralize that pH to bring it up to around pH five or six.

MR. MILLER: Then you have to allow travel from here to here, or are you going to actually add more injection wells?

MS. HWILKA: There are already multiple injection wells, and that also is part of the remedial -- the design phase, is determining where to put those injection wells to get at that pocket of contamination.

MR. MILLER: So, that should happen pretty quickly, I would think.

MS. HWILKA: That portion should be relatively short, you know, raising the pH. And then we would inject the reagent.

So, then, by having the higher pH, it fosters that adsorption reaction, that more complex one that's more permanent.

MS. O'CONNELL: What might take longer is the engineering design.

MS. HWILKA: Right.

MS. O'CONNELL: We're going to do a treatability study in one small area and collect data. That's going to help us determine how many injection points we need --

MS. HWILKA: Where we need them.

MS. O'CONNELL: -- how much

pH we need, how high the pH will go. So, that may take some time. But once we have the answers for that, we'll be able to design a system that will be effective.

So, we'll be doing it on a pilot on a small scale first and then we'll be refining the details of how best to implement it and then --

MR. MILLER: What happens if you overshoot and go to the caustic side of things?

What kind of effects does that have on the metals there, any?

MS. O'CONNELL: We're not looking to raise the pH above what's natural here, which natural pH is a little low here, about five or six.

MS. HWILKA: It would be raised slightly above initially to foster this reaction, but then all of that would be -- but the thing to remember is that we're still monitoring the whole well network, so we'll be able to see if the pH remains too high or something like that.

But given the current site conditions, we don't anticipate that will happen, but that's why we do monitor and why we have the treatability study. So, if anything, probably you wouldn't overshoot initially. You might start off slow, see how that works first, and then move forward from there.

MR. NIPE: Is this a proven design or are you hoping it will work?

MS. HWILKA: No, no, reagent injection has been used.

MR. NIPE: There's lead sites all over the country.

Is it working someplace else?

MR. SKORKA: I believe it

has, yes.

MS. HWILKA: I don't have a site offhand, but, yes, there has been documentation, there are studies that have been done --

MR. NIPE: You have one ten miles down the road that I know is just as bad as this, if not worse.

MS. HWILKA: Well, I'm not sure what site that is, but we do have studies for reagent injection for use with metals, and that's why we actually started looking at this, because it seemed to be more efficient and effective and more permanent, you know, again, taking less time to achieve the same goal.

And, again, we're not just throwing stuff into the ground. As Kim O'Connell stated, we have a treatability study where we will be testing. And you know what? If it doesn't work, we're not going to do it if it doesn't work.

You know, we would re-evaluate things.

But that's the whole point. The treatability studies are done for multiple sites for multiple reasons for multiple media. It's just a way to initially evaluate what we do and then scale it up from there.

MS. COY: Susan Coy.

I live across from the site on Route 130 and Railroad Avenue. The site is right across the street from where I live. I have to drill a new well.

How do I know that it will be safe?

Right now, I spend $1,200 a year on drinking water from Deer Park because the water is so acidic.

MS. HWILKA: Well, I know Railroad Avenue is a little further east than where we've been sampling.

MS. COY: It's also west.

How do I know after spending $6,000 to drill the well that it will be safe?

MS. O'CONNELL: We're not sure what the pH will be. The pH is a little low here, but that's the natural pH in this area.

MS. COY: I have health concerns.

MS. O'CONNELL: That's not related to the site, that's the natural condition of the area. The pH is further lowered on the site because of activities on the site.

But there are private wells along 130 that are meeting drinking water standards that are closer to the site than where you are.

When you put a well in, they sample it. The person who puts the well in then samples it.

MS. COY: After you pay for

it.

MS. O'CONNELL: I think they have to. When they install a new well, they have to sample it.

MS. COY: Right.

You have to pay for that well first.

MS. O'CONNELL: Right.

So, you're saying how do I know it will be clean?

Off site won't be impacted. On site --

MS. COY: It's across the street. My mailbox is here.

MS. HWILKA: Our site is -- here's Pennsgrove-Pedricktown Road, then it would be Route 130, and then we have Porcupine Road somewhere up here --

MS. COY: You have signs posted up across the street from me, that's all.

MS. HWILKA: Right. The signs are probably making you aware that there is a Superfund site in the vicinity.

But our actual site is bordered by that east stream, basically, which is west of Porcupine Road. So, it's not -- our site doesn't extend all the way out, if I'm understanding where Railroad Avenue is. I think that's several --

MS. COY: I'm right on the corner of Railroad Avenue and 130.

MS. HWILKA: Right.

Our contamination is only around this area, even closer than Porcupine Road. Here's the east stream and Benjamin Green Road, and our contamination is in this area and the groundwater flows west.

So, it sounds like you're east of the site and several -- a few blocks, quite some area away.

MS. COY: Not that far.

MS. HWILKA: Right.

But our groundwater -- what

I'm saying is our clean zone has been established to not have reached Porcupine Road or Railroad Avenue and our flow is in the opposite direction.

And we've seen decreasing concentrations over time, so our contamination, site-related contamination, is located just in this general vicinity.

So, we haven't tested your well, obviously, but in terms of site-related, I'd be hard-pressed to think that NL would have had site contamination east of this area.

MS. COY: There's also contamination from another company here.

MS. HWILKA: Well, I'm not aware of that. This is just for NL Industries.

MS. LONEY: Are there any further questions?

MR. BRADFORD: I have one.

George Bradford. Follow-up on what Bill was asking.

What are we talking about, a ten-year program?

Is that what this will revolve around?

MS. HWILKA: It's going to take a little bit of time to do the treatability study, and then once we have the design --

MR. BRADFORD: Are you including that in the ten years?

MS. HWILKA: No.

The ten years is once we have established --

MR. BRADFORD: So, you do the treatability study, and then you're saying another ten years probably?

MS. HWILKA: Right.

But, again, once we have our design and everything has been implemented, you can still reuse -- I know that's a concern of the town -- you can reuse a portion of the property because if we go with reagent injection, it's not as invasive as the pump and treatment, we're not building a big plant. There will be a series of injection wells that we would just need to have access to to sample.

So, it would depend on the site use.

MR. BRADFORD: At what point would we be able to use the land again?

MS. O'CONNELL: Well, we don't own the property. The property is abandoned, as we understand it.

We support the appropriate use of Superfund sites, you know, as appropriate. So, we're going to be doing some work at this site, but there's a lot of areas of the site where we're not going to do work.

We've spoken to the town

before. The town has been interested in the potential of redeveloping the site or using it for some purpose. So, we will tell you that that's not out of the question, although we will need to access the site.

But we will not be building a giant plant that's going to be taking up this whole site. That's not what we anticipate.

So, if the town is interested in redeveloping the site or has a developer or somebody, I don't even know who owns the site. I don't think the town owns it. I think it's been abandoned.

MR. BRADFORD: We hold the taxes on it.

MS. O'CONNELL: Right, a tax lien.

So, in order for somebody to take title to a Superfund site, you know, they would want to do it in a way where they don't have any liability.

MR. BRADFORD: Exactly.

MS. O'CONNELL: So, there are ways to do that, but you would need to contact our attorneys and the town attorney. And our attorney could discuss that. There are ways to do that because we, in general, support use of these sites if there's a compatible use with what we're doing.

So, you would need to tell us what you want to do, we would have to have the attorneys speak so that they can discuss how you would take title if the town wants to take title of the property, how they would do it without gaining any liability.

There's a lot of laws and rules, but there's ways to do it. But prior to doing it, we would advise you to discuss it.

MR. MILLER: We need to have that meeting.

MR. BRADFORD: That's right.

MS. O'CONNELL: That's fine. Contact Theresa.

MS. HWILKA: What we need, though, is your attorneys to talk to our attorneys.

MR. MILLER: Yes, yes.

MS. HWILKA: And then once we get to -- the next step would be if we go with this ROD amendment and that gets finalized, then we go into remedial design.

That is a good time if you already know or have someone interested in a particular use, if we get specific design documents, not just like I want to use this area but like what are you using it for, what's the footprint, is it just a cement slab structure, you know, things like that so that when we are doing our design, if we can accommodate, you know, a structure by moving an injection well over, we would try to do that.

But, again, the remedy comes first, so, we need to put the wells where they need to go. But if you're in the process early on, we can try to look at the designs and work together to try to accommodate the reuse.

We don't have to necessarily wait until we meet cleanup standards because there's going to be a restriction that they can't use the groundwater on the site, obviously, but the physical, you know, land surface can be utilized.

Sir?

MR. KENNEDY: Zeke Kennedy.

My property is adjacent. My problem is my whole yard is full of flags.

MS. HWILKA: Flats?

MR. KENNEDY: Flags.

They come and dig the soil out of the ground, and this happens every two years.

Now, you're telling me that this is going to happen for the next ten years?

MS. HWILKA: No.

The groundwater wells are more in the vicinity of the former facility area. But we already have a well network that extends more around this area. And if we need more injection wells, it would be a well that --

MR. KENNEDY: I'm not talking about wells, I'm talking about flags.

MS. O'CONNELL: Oh, flags.

MR. KENNEDY: Is this going to happen for the next ten years?

MS. HWILKA: Well, no.

What happened was we were doing monitoring and we found some additional pockets of lead, and, so, we re-sampled the whole length of the west stream.

And that's the activity that -- the areas where we found lead are going to be excavated this summer, and then we'll do our confirmatory sampling. And once that meets our standards, we'll be monitoring occasionally but not to the extent of all the recent sampling that you've seen.

MR. KENNEDY: They come out a couple years ago, they sent me a piece of paper saying my property is clean. Now they're back again.

MS. HWILKA: Well, I'll have to look at where your property is located exactly. And, you know, it's in our comments, so I can look on to that comment and look specifically --

MR. KENNEDY: My concern is for ten years, am I going to have these flags for ten years?

MS. HWILKA: No.

That's our goal here. We

did a more extensive sampling and tighter grid to make sure that we're not missing areas of contamination because that's a -- with the sediment, you're in the stream/wetland area, so sediment doesn't stay in one place, it shifts around a little bit. So, we closed our grids and that's why we did this extensive sampling, so we could be sure we've got it all this time around.

So, once it's excavated and we monitor it, subsequent to that, I mean, it shouldn't be a ten-year thing, it should be --

MR. KENNEDY: Well, actually they included my well in 1980 or whatever it was, probably 1980s. I don't know when it was. Put an alarm supposedly, I don't know.

MS. HWILKA: And we were looking at the sediment at the time adjacent to the stream. But, you know, it's not going to be every year for ten years.

MS. O'CONNELL: We will be doing some additional sediment excavation this summer, maybe into the fall. We expect that that will address any remaining sediment contamination. All the flags will be removed and all the area that we excavate will be restored.

MR. KENNEDY: And that's it?

MS. O'CONNELL: That's the plan.

MR. DANSOME: Earl Dansome again.

Will the design be done by the EPA or a third party?

MS. HWILKA: The responsible party will draw up the work plan; however, we review extensively and have our hydrogeologists, we have risk assessment, everybody at EPA, our whole group will look at the plan. We comment. So, if we don't agree with something, we make a comment. We approve it, basically.

So, they write it. Once we determine they've addressed all our comments and we're comfortable with the plan, we can approve it. And, also, the State reviews it as well.

So, it's not like they just get to decide what they want to do. EPA, that's what our oversight is for.

MR. DANSOME: Once the ROD is done, they'd be locked into the agreement stating they're responsible for it.

Correct?

MS. HWILKA: Correct. Once we select the remedy, that's what they have to do.

MR. DANSOME: They have the responsibility to select the consultant or contractor or whoever to do the work?

MS. HWILKA: Correct.

But, again, whatever contractors they choose, that work product gets reviewed by us and nothing gets implemented until we approve it.

MR. DANSOME: Okay.

MR. KENNEDY: This stuff you inject, you inject it right into the wells?

MS. HWILKA: We inject into the groundwater well network.

MS. O'CONNELL: It's under in the vicinity of the dump, right where it's contaminated.

MS. HWILKA: We don't pierce the cap. The landfill is addressed. That's covered and capped. We don't deal with that.

All our wells are, you know, around here, so we would inject into the wells.

MR. KENNEDY: That's the lining?

MS. HWILKA: Yes, the whole landfill is capped, it's contained.

MR. KENNEDY: They put that rubber lining on top of that already?

MS. HWILKA: Right, they maintain it. They have to -- I know there was a point where we regraded it and restructured it because the grade wasn't -- that's been taken care.

MS. DOLBOW: Jaime Dolbow.

I guess my only concern right now is when the gentleman asked about whether another Superfund site used what you're recommending, I don't feel like you gave us a strong oh, we know it works, blah, blah, blah.

Who else -- are we entitled to know who else has ever used this process?

MS. HWILKA: We know it works, I just don't know the sites offhand. But in my responsiveness summary, I can come up with a list of areas where it has been used.

In our Feasibility Study, we provided all the studies that have shown where reagent injection has worked and has been successful. We don't just use remedies -- it has to be proven. We don't just use it to try it out.

MS. O'CONNELL: We have selected a reagent injection remedy at the Puchack Well site. We've done a treatability study there. It's a different type of site, with chromium contamination in groundwater, hexavalent chromium.

We're injecting lactate into it, and we've done treatability studies which went very well, we're very confident, and we're going to be starting the injections later this year.

And there are some other sites. We can get you information on other sites where it's been used. Even though it's proven technology and we have collected extensive data on the hydrology conditions here and we believe it's going to work, we have high level of confidence it will work, we will be doing a treatability study in a small area to confirm that and to collect data to give us -- so we can design the details of how we're going to do it.

Sometimes injection points need to be ten feet or twenty feet apart. It depends on the condition of the site. So, we will be doing some additional onsite work on a small scale which will not only -- we expect it to confirm it's going to work, and it will also help us design the details on how to make it work in this particular site in this specific geology.

MS. LONEY: Are there any further questions?

UNKNOWN SPEAKER: How soon is this remedy going to begin?

MS. O'CONNELL: We expect to select a remedy approximately in September, within a couple of months. We have to close the public comment period and make sure we're fully considering all public comments, and we'll select a remedy later this year. And then we need to work with the responsible parties and come up with the design or plan, do a treatability study.

That's likely to take a couple of years by the time that's done. That's just how it works. Groundwater remedies are very complex, and the details -- the description of remedy is not complex, but the details are on how it will get implemented effectively.

The engineering design generally takes, once it's started, anywhere between one and a half and two a and half years. In this particular case, the treatability study will be a big part of it. That will take some time. It's necessary in order for us to ensure that the full implementation of the remedy is going to be done effectively.

So, it's going to be a few years before we go to full-scale implementation of the remedy.

MS. COY: Are you saying it's going to be three to five years, then?

That's what it sounds like.

MS. O'CONNELL: I think maybe a little less than that. Again, we'll have to keep you guys updated as we go along, but I think it would be less than that.

I mean, you still have to develop the plans for the treatability study and the work plan.

MS. COY: Sounds like three to five years, then.

MS. O'CONNELL: I don't think it will take three to five years. I mean, if we start later this year, the treatability study would likely start next year. How long that's going to take, I'm not really sure. We're going to have experts from, you know, ORD and we'll have a lot of people look at it to make sure it's accurate.

It's going to be a detailed work plan and a detailed treatability study, and the results have to be analyzed carefully so that an engineering design can be done.

And an engineering design has several phases. You know, there's a preliminary design, then we review it, then we go to an intermediate and a final design until it's approved. So, it's not a short-term process.

Groundwater, when you get into the details, it's complex. There's a lot of details that will be dealt with.

MS. HWILKA: And in all this interim, we'll be doing monitoring. It's not like we'll just stop while we're doing this design.

MS. O'CONNELL: I would hope that we'd be able to implement the remedy closer to three years than five years, but we will have to keep the community informed as to the schedule as we go forward.

UNKNOWN SPEAKER: There was a special on the New Jersey channel about a week and a half ago, and it was on this. And I could have swore I heard -- because I was shocked. I didn't really know about this until the special came on the New Jersey station about a week and a half ago, and I called my husband at work and said: You need to hear this.

I thought I heard them say they were having problems getting National Lead to put -- it didn't sound good.

MR. SKORKA: They were talking about a different site for them, in Sayreville.

UNKNOWN SPEAKER: They were talking about a couple sites.

MS. HWILKA: Right, but not this site.

MR. SKORKA: That was the Raritan River and sites along there.

MS. HWILKA: There's another NL site, in other words.

MR. SKORKA: There were several sites.

UNKNOWN SPEAKER: It's National Lead.

MS. HWILKA: Yes, it is National Lead, but it's a different site. It's the same company.

But wherever they had facilities, there was contamination, just as we have one facility here. This is one site. NL had lead on another site, and that's the one referred to in the special.

MR. BERCUTE: I think you've got my name, Tom Bercute.

Who is it ultimately up to?

Who can decide on when we can use this land?

Is it up to the EPA attorney?

MS. HWILKA: What it's up to first is you have to own the property. EPA doesn't own it.

MR. BERCUTE: I mean, I've been talking about this property for years now.

MS. HWILKA: You need to talk to --

MR. BERCUTE: And I've talked to Demaris.

MS. HWILKA: Demaris, yes.

MR. BERCUTE: Is he still with the EPA?

MS. HWILKA: She's the EPA attorney.

But as Kim stated, what needs to happen, as the mayor has stated, the town's attorney needs to speak with EPA's attorney I guess to determine what to do with the property in terms of ownership --

MR. BERCUTE: I mean, I could have used this years ago and generated money for this town and possibly created jobs for the local residents.

MS. HWILKA: But we don't own the site, so the ownership portion needs to be worked out between yourself and the town, and the town will work with us in terms of the liability issues.

But once we know who owns it and what you want to use it for, again, specifically design, not just I want to use this area for storage, but a physical design --

MR. BERCUTE: I think I've actually e-mailed you.

MS. HWILKA: Yes, you e-mailed me about a general area for storage.

But, again, we don't own the property right now, so it needs to be worked out with the town, the ownership.

MR. BERCUTE: I talk to Mr. Miller and then the Pedricktown attorney talks to the EPA attorney.

Is that how it works?

MS. HWILKA: It has to be -- yes, the town's attorney and our attorney need to talk because they need to figure out who will own the property because it's abandoned. Again, we don't own it, so we can't say --

MR. BERCUTE: Right.

I want to help generate money for the town, not have it a liability. If we can use it now, you know, for our purposes, then that would help the whole town.

MS. HWILKA: Again, once it's worked out with the town and they know they own it or what have you --

MS. O'CONNELL: You want to take ownership without liability.

MR. BRADFORD: The liability, that's always been the problem.

MS. O'CONNELL: There are ways to do that, but they involve legal determinations. So, that's where the attorneys need to get involved.

There are laws that will protect people if they do certain things or follow certain conditions, and that's what needs to be -- you need to understand and our attorneys will explain that to you. And then --

MR. BERCUTE: We're actually very familiar with doing things like that. We worked with Dadorac in Delaware, the state government in South Carolina, DHEC, and we've worked with EPA people too. So, we're familiar with that.

We actually have monitoring wells on our site right now and we're familiar with access, letting people in to do their testing, and we work -- you know, we work with the EPA, DEP.

MS. O'CONNELL: We're not concerned with respect to anybody being on site and being exposed to the soil. That's all meeting cleanup standards.

Our concern would be that we need certain access and we need whoever owns the property to give us access and we need a certain area to implement our remedy.

Other than that, as long as

what's being done is not incompatible with our remedy and not where we want to implement the remedy physically, we won't have concerns about some storage facility or some appropriate use of that site.

But we need to work together.

MR. BERCUTE: Exactly. That's what I want to do. That's what I've been trying to do for years, as far as I've been open to, you know, where you would have the access. We wouldn't do any digging, you know.

I've been open to any ideas, and it's really just kind of been blocked. I don't know if this has to be approved first before we can move forward.

MS. O'CONNELL: Well, it helps when we know exactly what we want to do once we select the detailed remedy and we have conceptual -- not every detail, but we have a conceptual idea of what we want to do and what space we would need, what access we would need.

MR. BERCUTE: And I want to work with you guys. I know you guys weren't the ones who polluted the land.

MS. O'CONNELL: Somebody wants to develop it, somebody has to own it. Nobody owns it. That's the --

MR. BERCUTE: Should I just go there and stand there until somebody talks to me?

MS. O'CONNELL: Possession is nine-tenths of the law.

(Laughter)

MS. HWILKA: It almost sounds like we need to have our attorneys talk with the town, and then --

MR. BERCUTE: Yeah, I think I'll have to meet with Mr. Miller.

MS. HWILKA: And subsequent to that, perhaps you guys would want to meet to see what you can work out in terms of ownership.

And at that point, you know, if the town decides okay, we're selling this property and your company or whoever happened to purchase it has their design, that's where, you know, we then would work with -- you know, you can work with EPA to facilitate your construction without hindering our remedy.

MR. BERCUTE: Exactly.

Again, we're familiar with that, we've done it, we've completed projects like that. So, that wouldn't be a problem as far as, you know, us being there.

MS. HWILKA: We'll follow up on that with the attorneys.

MS. LONEY: If there are no further questions, we're going to close the public meeting.

Again, the comment period is closing on the 21st of July. So, if you haven't submitted -- if you'd like to submit your comments, you can send it to Theresa. That's her e-mail address. It's also on the back of the proposed plan. You can e-mail it to her or send it via snail mail.

In addition, the proposed plan is on that web page. I think maybe we'll post --

You want to post the presentation as well?

MS. HWILKA: Sure.

MS. LONEY: We'll also post tonight's presentation and you can access it on that site if there's anything you want to review further before you submit your comments.

If you have not done so, I ask that you sign in because one of the things that happens during the transcribing of the stenographer's notes is if she didn't necessarily get a name, she can check it off of the sign-in sheet. So, take an opportunity to sign in as you're leaving.

And I thank you all for coming. July 28 is the -- I don't want to say drop dead date, but it's the closing date.

So, thank you all.

(Time noted: 8:12 p.m.)

C E R T I F I C A T E

STATE OF NEW YORK)
) ss.
COUNTY OF NEW YORK)

I, LINDA A. MARINO, RPR, CCR, a Shorthand (Stenotype) Reporter and Notary Public of the State of New York, do hereby certify that the foregoing transcription of the public meeting held at the time and place aforesaid is a true and correct transcription of my shorthand notes.

I further certify that I am neither counsel for nor related to any party to said action, nor in any way interested in the result or outcome thereof.

IN WITNESS WHEREOF, I have hereunto set my hand this 2nd day of August, 2011.

Linda A. Marino

LINDA A. MARINO, RPR, CCR

APPENDIX IV – ADMINISTRATIVE RECORD INDEX

Doc ID # 39006

Document Number: NLI-001-0001 To 0010 Date: / /

Title: Potential Hazardous Waste Site Site Inspection Report - NL Industries Inc.

Type: PLAN
Author: Zervas, David: NJ Department of Environmental Protection (NJDEP)
Recipient: none: none

Doc ID# 54366

Document Number: NLI-001-0011 To 0108 Date: 05/01/83

Title: Hydrogeologic Study and Design of Ground Water Abatement System at NL Industries Inc., Pedricktown NJ Plant Site

Type: PLAN
Author: none: Geraghty & Miller
Recipient: none: none

Doc ID# 54367

Document Number: NLI-001-0109 To 0279 Date: 05/01/87

.itle: Work Plan - Remedial Investigation/Feasibility Study - National Smelting of NJ Site, Pedricktown NJ

Type: PLAN
Condition: INCOMPLETE; MARGINALIA
Author: none: O'Brien & Gere
Recipient: none: NL Industries, Inc.

Doc ID# 54368

Document Number: NLI-001-0280 To 0426 Date: 05/01/87

Title: Work Plan - Remedial Investigation/Feasibility Study - National Smelting of NJ Site, Pedricktown NJ

Type: PLAN
Author: none: O'Brien & Gere
Recipient: none: NL Industries, Inc.

Doc ID# 54369

Document Number: NLI-001-0427 To 0509 Date: 08/01/87

Title: OBG Laboratories, Inc. QA Program Manual - Remedial Investigation/Feasibility Study - National Smelting of NJ Site, Pedricktown NJ

Type: PLAN
Author: none: O'Brien & Gere
Recipient: none: NL Industries, Inc.

Doc ID# 54370

Document Number: NLI-001-0510 To 0537 Parent: NLI-001-0512 Date: 04/01/88

Title: Field Sampling and Analysis Plan - RI/FS Oversight - NL Industries Site, Pedricktown NJ

Type: PLAN
Author: Horzempa, Lewis M: Ebasco Services
Recipient: none: US EPA

Doc ID# 54371

Document Number: NLI-001-0512 To 0513 Date: 05/03/88

Title: (Letter submitting Field Sampling and Analysis Plan)

Type: CORRESPONDENCE
Author: Sachdev, Dev R.: Ebasco Services
Recipient: Alvi, M. Shaheer: US EPA
Attached: NLI-001-0510

Doc ID# 54372

Document Number: NLI-001-0538 To 0889 Parent: NLI-001-0539 Date: 05/01/88

Title: Site Operations Plan - Remedial Investigation Plan/Feasibility Study - National Smelting of NJ Site, Pedricktown NJ

Type: PLAN
Author: none: O'Brien & Gere
Recipient: none: NL Industries, Inc.

Doc ID# 54373

Document Number: NLI-001-0539 To 0540 Date: 05/10/88

Title: (Letter submitting the Final Site Operations Plan)

Type: CORRESPONDENCE
Condition: MARGINALIA
Author: Holt, Stephan W.: NL Industries, Inc.
Recipient: Donato, Kerwin: US EPA
Attached: NLI-001-0538

Doc ID# 54374

Document Number: NLI-001-0890 To 1265 Date: 06/01/90

Title: Technical Memorandum - Data Validation - National Smelting of NJ Site, Pedricktown NJ

Type: PLAN
Condition: MARGINALIA
Author: none: O'Brien & Gere
Recipient: none: NL Industries, Inc.

Doc ID# 54375

Document Number: NLI-001-1266 To 1280 Date: 12/01/90

Title: NL Industries Sediment Analyses - Phase III

Type: DATA
Author: none: none
Recipient: none: none

Doc ID# 54376

Document Number: NLI-001-1281 To 1282 Date: 11/01/90

Title: NL Industries Soil Analyses - Phase III

Type: DATA
Author: none: none
Recipient: none: none

Doc ID# 54377

Document Number: NLI-001-1283 To 1297 Date: 12/01/90

Title: NL Industries Groundwater Analyses - Phase III

Type: DATA
Author: none: none
Recipient: none: none

Doc ID# 54378

Document Number: NLI-001-1298 To 1304 Date: 12/01/90

Title: NL Industries Surface Water Analyses - Phase III

Type: DATA
Author: none: none
Recipient: none: none

Doc ID# 54379

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Document Number: NLI-001-1305 To 1312 Date: 12/01/90

Title: NL Industries Sediment Analyses - Phase III

Type: DATA
Author: none: none
Recipient: none: none

Doc ID# 54380

Document Number: NLI-001-1313 To 1322 Date: 08/01/89

Title: NL Industries Oversight Groundwater Analyses - Phase II

Type: DATA
Author: none: none
Recipient: none: none

Doc ID# 54381

Document Number: NLI-001-1323 To 1347 Date: 10/01/88

Title: (Phase I Water and Soil Analyses, Site Maps)

Type: DATA
Author: none: none
Recipient: none: none

Doc ID# 54382

Document Number: NLI-001-1348 To 1393 Date: 04/01/90

Title: Final RI Oversight Summary Report - NL Industries Site, Pedricktown NJ

Type: REPORT
Condition: MARGINALIA
Author: Rubin, David B: Ebasco Services
Recipient: none: US EPA

Doc ID# 54383

Document Number: NLI-001-1394 To 1673 Date: 10/01/90

Title: Remedial Investigation - National Smelting of NJ/NL Industries Site Volume I: Report, Tables, Figures

Type: REPORT
Author: none: O'Brien & Gere
Recipient: none: NL Industries, Inc.

Doc ID# 54384

Document Number: NLI-001-1674 To 2187 Date: 10/01/90

Title: Remedial Investigation - National Smelting of NJ/NL Industries Site Volume II: Appendices, Exhibits

Type: REPORT
Author: none: O'Brien & Gere
Recipient: none: NL Industries, Inc.

Doc ID# 54385

Document Number: NLI-001-2188 To 2319 Date: 12/01/90

Title: Remedial Investigation - National Smelting of NJ/NL Industries Site Volume III: Appendices R-U

Type: REPORT
Author: none: O'Brien & Gere
Recipient: none: NL Industries, Inc.

Doc ID# 54386

Document Number: NLI-001-2320 To 2342 Date: 06/14/90

Title: (Letter forwarding the revised RI Oversight Summary Report)

Type: CORRESPONDENCE
Author: Rubin, David B: Ebasco Services
Recipient: Gilbert, Michael H: US EPA
Attached: NLI-001-2323

Doc ID# 54387

Document Number: NLI-001-2323 To 2342 Parent: NLI-001-2320 Date: 04/01/90

Title: Final RI Oversight Summary Report - NL Industries Site, Pedricktown NJ

Type: REPORT
Author: Rubin, David B: Ebasco Services
Recipient: none: US EPA

Doc ID# 110834

Document Number: NLI-001-2343 To 2354 Date: 07/19/90

Title: (Letter forwarding attached summary comparison of USEPA and NL Industries data for the Phase II split samples)

Type: CORRESPONDENCE
Author: Rubin, David B: Ebasco Services
Recipient: Gilbert, Michael H: US EPA

Doc ID# 54388

Document Number: NLI-001-2355 To 2358 Date: 09/19/90

Title: (Letter indicating need for additional sampling at the site)

Type: CORRESPONDENCE
Condition: MARGINALIA
Author: Basso, Raymond: US EPA
Recipient: Holt, Stephen W: NL Industries, Inc.

Doc ID# 54389

Document Number: NLI-001-2359 To 2361 Date: 10/05/90

Title: (Letter requesting retesting of soils and rejecting request for extension for submittal of RI Report)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Holt, Stephen W: NL Industries, Inc.

Doc ID# 54390

Document Number: NLI-001-2362 To 2365 Date: 11/15/90

Title: (Letter conveying approval of the amended Sampling Plan and outlining methods for sample collecting and analysis)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Holt, Stephen W: NL Industries, Inc.

Doc ID# 54391

Document Number: NLI-001-2366 To 2367 Date: 11/26/90

Title: (Letter outlining analysis guidelines)

Type: CORRESPONDENCE
Author: Gilbert, Michael H: US EPA
Recipient: Holt, Stephen W: NL Industries, Inc.

Doc ID# 54392

Document Number: NLI-001-2368 To 2370 Date: 11/29/90

Title: (Letter stating EPA's intention to take and analyze samples from the site)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Holt, Stephen W: NL Industries, Inc.

Doc ID# 54393

Document Number: NLI-001-2371 To 2373 Date: 03/06/91

Title: (Letter requesting changes in the 10/90 Remedial Investigation Report)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Holt, Stephen W: NL Industries, Inc.

Doc ID# 54394

Document Number: NLI-001-2374 To 2385 Date: 04/23/91

Title: (Letter forwarding attached information pertaining to wells at the site)

Type: CORRESPONDENCE
Author: Holt, Stephen W: NL Industries, Inc.
Recipient: Kothari, Dilip: Ebasco Services

Doc ID# 54395

Document Number: NLI-001-2386 To 2390 Date: 04/10/89

Title: Preliminary Health Assessment for NL Industries

Type: PLAN
Author: none: Agency for Toxic Substances & Disease Registry (ATSDR)
Recipient: none: none

Doc ID# 54396

Document Number: NLI-001-2391 To 2391 Date: 02/28/91

Title: (Letter stating that NL Industries will have to close the underground storage tanks at the site)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Holstrom, Christina: NJ Department of Environmental Protection (NJDEP)
Recipient: Gilbert, Michael H: US EPA

Doc ID# 54397

Document Number: NLI-001-2392 To 2392 Date: / /

Title: (List of EPA Guidance Publications)

Type:
Author: none: none
Recipient: none: none

Doc ID# 54398

Document Number: NLI-001-2393 To 2393 Date: 08/20/90

Title: (Letter requesting applicable or relevant requirements which pertain to the site)

Type: CORRESPONDENCE
Author: Gilbert, Michael H.: US EPA
Recipient: Holstrom, Christina: NJ Department of Environmental Protection (NJDEP)

Doc ID# 54399

Document Number: NLI-001-2394 To 2394 Date: 10/15/90

Title: (Letter regarding applicable or relevant requirements for testing at the site)

Type: CORRESPONDENCE
Author: Holstrom, Christina: NJ Department of Environmental Protection (NJDEP)
Recipient: Gilbert, Michael H.: US EPA
Attached: NLI-001-2409

Doc ID# 54400

Document Number: NLI-001-2395 To 2408 Date: 11/27/90

Title: (Referral form forwarding attached surface water ARARs for the site)

Type: CORRESPONDENCE
Author: Holstrom, Christina: NJ Department of Environmental Protection (NJDEP)
Recipient: Gilbert, Michael H.: US EPA

Doc ID# 54401

Document Number: NLI-001-2409 To 2412 Parent: NLI-001-2394 Date: 03/01/88

Title: Regulations Implementing the New Jersey Water Pollution Control Act

Type: LEGAL DOCUMENT
Author: none: NJ Department of Environmental Protection (NJDEP)
Recipient: none: none

Doc ID# 54402

Document Number: NLI-002-0001 To 0119 Date: 09/01/90

Title: Regulations Implementing the New Jersey Underground Storage of Hazardous Substances Act

Type: LEGAL DOCUMENT
Author: none: NJ Department of Environmental Protection (NJDEP)
Recipient: none: none

Doc ID# 54403

Document Number: NLI-002-0120 To 0162 Date: / /

Title: NJDEP Fresh Water Permit Application

Type: OTHER
Author: none: none
Recipient: none: none

Doc ID# 54404

Document Number: NLI-002-0163 To 0185 Date: 12/01/86

Title: Final Community Relations Plan - NL Industries Site, Pedricktown, NJ

Type: PLAN
Author: Diamond, Christopher R.: ICF Incorporated
Recipient: none: US EPA

Doc ID# 54405

Document Number: NLI-002-0186 To 0208 Parent: NLI-002-0188 Date: 01/01/89

Title: Final Public Information Meeting Summary for the NL Industries Site, Redricktown, NJ

Type: PLAN
Author: Manning, Kathleen S.: ICF Incorporated
Recipient: none: US EPA

Doc ID# 54406

Document Number: NLI-002-0188 To 0189 Date: 01/23/89

Title: (Letter submitting the Final Public Information Meeting Summary)

Type: CORRESPONDENCE
Author: Sachdev, Dev R.: Ebasco Services
Recipient: Johnson, Lillian: US EPA
Attached: NLI-002-0186

Doc ID# 54407

Document Number: NLI-002-0209 To 0219 Date: 01/01/91

Title: Oversight Summary Report - NL Industries Site, Pedricktown NJ

Type: REPORT
Author: none: Ebasco Services
Recipient: none: US EPA

Doc ID# 54408

Document Number: NLI-002-0220 To 0261 Date: 01/01/92

Title: A Stage 1A Cultural Resources Survey of the NSNJ/NL Property, Oldmans Township, Salem County NJ

Type: PLAN
Author: Crist, Thomas A.J.: John Milner Associates
McCarthy, John P.: John Milner Associates
Recipient: none: O'Brien & Gere
none: NL Industries, Inc.

Doc ID# 54409

Document Number: NLI-002-0262 To 0363 Date: 03/01/91

Title: Volume IV, Appendices V-W, Remedial Investigation National Smelting of New Jersey, Inc./NL Industries, Inc. Site, Pedricktown, New Jersey

Type: PLAN
Author: none: O'Brien & Gere
Recipient: none: none

Doc ID# 54410

Document Number: NLI-002-0364 To 0367 Parent: NLI-002-2078 Date: 07/08/91

Title: (Letter approving the Remedial Investigation (RI) Report, Volumes I-IV for the NL Industries, Inc., site, in conjunction with EPA's enclosed RI Addendum, and approving the Feasibility Study Workplan with modifications specified in the letter.)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Holt, Stephen W.: NL Industries, Inc.

Doc ID# 54411

Document Number: NLI-002-0368 To 0375 Parent: NLI-002-2078 Date: / /

Title: Addendum to the Remedial Investigation, Volumes I-IV, NL Industries, Inc., Superfund Site, Pedricktown, New Jersey

Type: PLAN
Author: none: US EPA
Recipient: none: none

Doc ID# 54412

Document Number: NLI-002-0376 To 0428 Date: 07/01/93

Title: Addendum to the Final Feasibility Study Report, NL Industries, Inc. Superfund Site, Operable Unit One, Pedricktown, New Jersey

Type: PLAN
Author: none: US EPA
Recipient: none: none

Doc ID# 54413

Document Number: NLI-002-0429 To 0521 Date: 02/01/93

Title: Final Report, TCLP Screening, National Lead Industries Site, Pedricktown, NJ

Type: REPORT
Author: Bovitz, Paul: Environmental Response Team (ERT)
Sprenger, Mark D.: Environmental Response Team (ERT)
Recipient: none: none

Doc ID# 54414

Document Number: NLI-002-0522 To 0556 Date: 02/15/93

Title: Stage IB Cultural Resources Survey, National Smelting of New Jersey Property, Oldmans Township, Salem County, New Jersey

Type: PLAN
Author: Grubb, Richard C.: Richard Grubb & Associates, Inc.
Harmon, James M.: Richard Grubb & Associates, Inc.
Recipient: none: O'Brien & Gere

Doc ID# 54415

Document Number: NLI-002-0557 To 0557 Date: 05/12/93

Title: (Letter forwarding the "Final Feasibility Study Report," which addresses EPA's comments on the "Draft Feasibility Study Report for the Pedricktown site.")

Type: CORRESPONDENCE
Author: Caracciolo, Angelo J. III: O'Brien & Gere
Recipient: Gilbert, Michael: US EPA
Attached: NLI-002-0558

Doc ID# 54416

Document Number: NLI-002-0558 To 1129 Parent: NLI-002-0557 Date: 05/01/93

Title: Final Feasibility Study, NL Industries, Inc. Site, Pedricktown, New Jersey

Type: REPORT
Author: none: O'Brien & Gere
Recipient: none: US EPA

Doc ID# 54417

Document Number: NLI-002-1130 To 1228 Date: 06/01/93

Title: Final Report, Field Ecological Assessment, National Lead Site, Pedricktown, Salem County, NJ

Type: REPORT
Author: Bovitz, Paul: ERT
Sprenger, Mark D.: ERT
Recipient: none: none

Doc ID# 54418

Document Number: NLI-002-1229 To 1604 Date: 06/01/93

Title: Final Report, Field Ecological Assessment, National Lead Site, Pedricktown, Salem County, NJ - Appendices A to E

Type: REPORT
Author: Henry, Richard: ERT
Sprenger, Mark D.: ERT
Recipient: none: none

Doc ID# 54419

Document Number: NLI-002-1605 To 1899 Date: 06/01/93

Title: Final Report, Field Ecological Assessment, National Lead Site, Pedricktown, Salem County, NJ - Appendices F to L

Type: REPORT
Author: Henry, Richard: ERT
Sprenger, Mark D.: ERT
Recipient: none: none

Doc ID# 54420

Document Number: NLI-002-1900 To 1965 Date: 06/01/93

Title: Final Report, National Lead Industries, Pedricktown, New Jersey, Ecological Risk Assessment

Type: REPORT
Author: Grossman, Scott: ERT
Kracko, Karen: ERT
Sprenger, Mark D.: ERT
Recipient: none: none

Doc ID# 54421

Document Number: NLI-002-1966 To 1972 Date: 06/01/93

Title: Final Report, Recommendations for Ecologically Based Lead Remedial Goals, National Lead Industries, Pedricktown, New Jersey

Type: REPORT
Author: Sprenger, Mark D.: ERT
Recipient: none: none

Doc ID# 54422

Document Number: NLI-002-1973 To 1973 Date: 06/25/93

Title: (Memo containing comments on the May 1993 Final Feasibility Study Report for the NL Industries site)

Type: CORRESPONDENCE
Author: Prendergast, John: New Jersey Department of Environmental Protection and Energy
Recipient: Harvey, Paul: New Jersey Department of Environmental Protection and Energy
Attached: NLI-002-1974

Doc ID# 54423

Document Number: NLI-002-1974 To 1974 Parent: NLI-002-1973 Date: 05/24/93

Title: (Memo stating that the NL Draft Feasibility Study has satisfactorily addressed Comments 1 and 2, which were mentioned in a February 9, 1993, memo)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Kaplan, David M.: New Jersey Department of Environmental Protection and Energy
Recipient: none: New Jersey Department of Environmental Protection and Energy

Doc ID# 54424

Document Number: NLI-002-1975 To 1994 Date: 07/01/93

Title: Superfund Proposed Plan, NL Industries, Inc. Operable Unit One, Pedricktown, Salem County, New Jersey

Type: PLAN
Author: none: US EPA
Recipient: none: none

Doc ID# 54425

Document Number: NLI-002-1995 To 2012 Date: 07/14/93

Title: (Action Memorandum requesting a ceiling increase and a removal action restart at the National Lead Industries Inc., Site, Pedricktown, Salem County, New Jersey)

Type: CORRESPONDENCE
Author: Dominach, Eugene: US EPA
Recipient: Muszynski, William J.: US EPA

Doc ID# 54426

Document Number: NLI-002-2013 To 2013 Date: 07/16/93

Title: (Letter responding to Mr. Gilbert's request regarding the potential routing and feasibility of the construction of a pipeline to the Delaware River)

Type: CORRESPONDENCE
Author: Holt, Stephen W.: NL Industries, Inc.
Recipient: Gilbert, Michael: US EPA

Doc ID# 54427

Document Number: NLI-002-2014 To 2060 Date: 12/01/90

Title: NL Industries, Sediment Analyses, Phase III Nov., Dec. 1990

Type: FINANCIAL/TECHNICAL
Author: none: Ebasco Services
none: O'Brien & Gere
Recipient: none: none

Doc ID# 54428

Document Number: NLI-002-2061 To 2073 Date: 01/01/91

Title: Oversight Summary Report - NL Industries Site, Pedricktown, New Jersey

Type: REPORT
Condition: DRAFT; MARGINALIA
Author: Rubin, David B.: Ebasco Services
Recipient: none: US EPA

Doc ID# 54429

Document Number: NLI-002-2074 To 2077 Date: 06/20/91

Title: (Letter indicating that the inorganic analyses for groundwater have misreported units.)

Type: CORRESPONDENCE
Author: Hale, Frank D.: O'Brien & Gere
Recipient: Holt, Stephen W.: NL Industries, Inc.

Doc ID# 54430

Document Number: NLI-002-2078 To 2078 Date: 08/13/91

Title: (Letter forwarding the revised results of the Phase III oversight samples and indicating that the units on the groundwater analysis have been revised.)

Type: CORRESPONDENCE
Author: Gilbert, Michael H.: US EPA
Recipient: Holt, Stephen W.: NL Industries, Inc.
Attached: NLI-002-0364 NLI-002-0368

Doc ID# 54431

Document Number: NLI-002-2079 To 2175 Date: 08/02/93

Title: Transcript of Proceedings - In the Matter of: Superfund Proposed Plan, NL Industries, Inc., Pedricktown, N.J.

Type: LEGAL DOCUMENT
Author: Butler, Virginia E.: Accurate Court Reporting Services
Recipient: none: none

Doc ID# 54432

Document Number: NLI-002-2176 To 2200 Date: 02/02/94

Title: (Memo forwarding the attached project summary for the Acid Extraction Treatment System and several sections from the final report detailing the Pedricktown soil)

Type: CORRESPONDENCE
Author: Paff, Stephen W.: Center for Hazardous Materials Research - (Univ. of Pittsburgh)
Recipient: Gilbert, Mick: US EPA

Doc ID# 54433

NL INDUSTRIES, INC.
OPERABLE UNIT ONE UPDATE
ADMINISTRATIVE RECORD FILE
INDEX OF DOCUMENTS

RECORD OF DECISION

P.	NLI 002 2201- NLI 002 2498	Record of Decision, NL Industries Inc., Pedricktown, Salem County, New Jersey, July 8, 1994.

Doc ID# 54434

NL INDUSTRIES, INC.
OPERABLE UNIT ONE
ADMINISTRATIVE RECORD FILE UPDATE #2
INDEX OF DOCUMENTS

5.0 RECORD OF DECISION

5.3 Explanations of Significant Differences

P. 500001 - 500007 Report: Explanation of Significant Difference, NL Industries Superfund Site, Pedricktown, Salem County, New Jersey, prepared by U.S. Environmental Protection Agency, Region 2, June 21, 1999.

Doc. ID# 107786

NL INDUSTRIES, INC.
OPERABLE UNIT ONE
ADMINISTRATIVE RECORD FILE UPDATE #3
INDEX OF DOCUMENTS

5.0 RECORD OF DECISION

5.2 Amendment to the Record of Decision

P. 500008 - 500401 — Report: Focused Feasibility Study for Groundwater Remediation, NL Industries Superfund Site, Pedricktown, New Jersey, prepared by CSI Environmental LLC, prepared for Interim Pedrick Site Group, Original: November 2007, Revised: September 2008, March 2009, February 2011, May 2011, and June 2011.
Doc. ID# 111372

P. 500402 - 500413 — Report: Superfund Program Proposed Plan, NL Industries, Inc. Superfund Site, prepared by U.S. Environmental Protection Agency, Region 2, July 17, 2011.
Doc. ID# 111373

APPENDIX V – STATE LETTER OF CONCURRENCE

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Case Management
401 East State Street
P.O. Box 420 Mail Code 401-05F
Trenton, NJ 08625-0028

BOB MARTIN
Commissioner

Walter Mugdan, Director
Emergency and Response Division
U.S. Environmental Protection Agency
Region II
290 Broadway
New York City, New York 10007-1866

September 2, 2011

RE: NL Industries Superfund Site
Record of Decision (ROD) Amendment Letter of Concurrence
Operable Unit 1 Amendment
Oldmans Township, Salem County
SRP PI# 025259

Dear Mr. Mugdan:

The New Jersey Department of Environmental Protection (Department) has completed its review of the September 2011 Record of Decision (ROD) amendment for the Groundwater Remediation at the NL Industries Superfund Site, Oldmans Township, Salem County prepared by the U.S. Environmental Protection Agency (EPA) Region II. The Department concurs with the selected groundwater remedy for the site.

In 1994, U.S. Environmental Protection Agency selected extraction and treatment of groundwater in the Record of Decision for OU-1. The response action described in this ROD amendment addresses the change in the selected remedy from extraction and treatment of groundwater to in-situ groundwater remediation. The goal is to restore the groundwater to drinking water standards.

The major components of the selected groundwater remedy are as follows:

- Reagent injection
- Groundwater monitoring
- Institutional controls, including a classification exception area.

The Department appreciates the opportunity to participate in the decision making process to select an appropriate remedy for ground water at the NL Industries Site and is looking forward to future such cooperation with EPA during the remaining remedial work at this site.

Sincerely,

Leonard Romino

Leonard Romino, Assistant Director
Responsible Party Remediation

cc: Honorable William Miller, Mayor, Oldmans Twp.
Melinda Taylor, Municipal Clerk, Oldmans Twp.
Theresa A. Hwilka, USEPA Region II